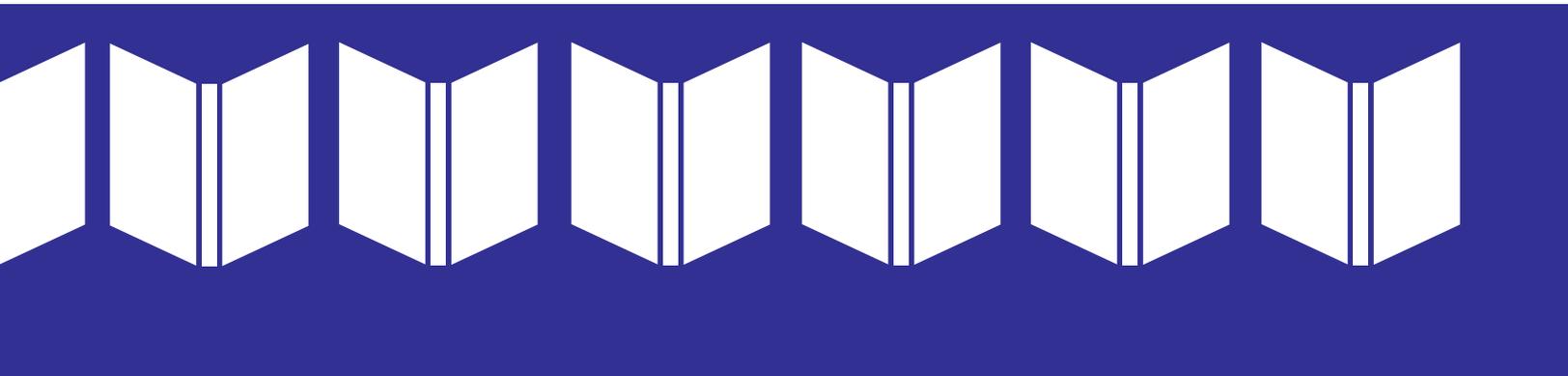


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TABLE OF CONTENTS

Guest Editor: *Teresa Northern Miller*

The Role of Partnerships in the Professional Doctorate in Education: A Program Application in Educational Leadership	5
Susan Toft Everson	
Creating Professional Learning Communities in a Traditional Educational Leadership Preparation Program	10
Gini Doolittle, H. Mark Stanwood, and Herb Simmerman	
Year One of School Improvement: Examples from Nine Schools	17
Stephen Gordon, Suzanne Stiegelbauer, and Julie Diehl	
Partnership, Preparation, and Progress in Training Community College Administrative Leaders.....	30
Ramon Dominguez	
Cognitive Development of Adult Undergraduate Students: Cohort and Non-Cohort Settings	35
Royce Ann Collins	
Commentary	
The CADRE Project: Looking at the Development of Beginning Teachers	42
Sheryl McGlamery, Jarene Fluckinger, and Nancy Edick	
How Much Do Schools and Districts Matter? A Production Function Approach to School Accountability.....	51
James L. Phelps and Michael F. Addonizio	

Errata: The institutional affiliation of Simone Conceição was incorrectly listed in the Fall 2005 issue. She is Assistant Professor of Adult Education in the Department of Administrative Leadership at the University of Wisconsin-Milwaukee.

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Foreword

Faith E. Crampton, Executive Editor
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This issue, guest-edited by Teresa Northern Miller, represents the third and final issue in a trilogy exploring the reform of educational leadership preparation programs in the United States. Recent criticisms of the quality of the university-based programs,¹ as well as the continuing pressure from the state and federal levels to improve student achievement and to close the longstanding achievement gap between socioeconomically disadvantaged students and their more advantaged peers,² have placed the efficacy of educational leaders at the school and district levels in the spotlight. As such, the articles found in these three issues are very timely.

The first issue of this trilogy, with guest editors Michelle D. Young, Meredith Mountford, and Gary M. Crow, focused on “improving program curricula, pedagogy, and entire programs” in educational leadership preparation.³ They noted that many of the reforms currently being implemented in educational leadership preparation programs across the country have been informed by the work of professional associations, states, and foundations. These include, for example, the Interstate School Leadership Licensure Consortium (ISLLC), the National Council for Accreditation of Teacher Education (NCATE), the Educational Leadership Constituent Council (ELCC), the Southern Regional Education Board (SREB), the National Association of Elementary School Principals (NAESP), Mid-Continent Research for Education and Learning (McREL), the University Council for Educational Administration (UCEA), the National Policy Board for Educational Administration (NPBEA), the National Commission for the Advancement of Educational Leadership Preparation (NCAELP),⁴ and the Wallace Foundation, which has funded State Action for Educational Leadership Preparation (SAELP) grants.

Articles in the Spring 2005 issue highlighted pedagogy, student learning, and program evaluation in educational leadership preparation programs. In “Transferring Learning from the Classroom to the Workplace: Challenges and Implications for Educational Leadership Preparation,” Bruce G. Barnett explored how knowledge and skills learned in university classrooms are best transferred to other environments. Kathleen M. Brown described a pedagogical approach that interweaves transformative learning theory and adult learning strategies and evaluated its effects in an educational leadership preparation program in “Transformative Adult Learning Strategies: Assessing the Impact on Pre-Service Administrators’ Beliefs.” In “Learning Outcomes of an Educational Leadership Cohort Program,” Pamela D. Tucker, Cheryl B. Henig, and Michael J. Salmonowicz described a new approach to program evaluation that centers on direct learning outcomes. Donald G. Hackmann and Thomas L. Alsbury discussed how data on student learning outcomes from ISLLC-aligned student portfolios were being used for program improvement in one institution’s educational leadership program for aspiring principals in “Standards-Based Leadership Preparation Program Improvement Through the Use of Portfolio Assessments.”

In the second issue, guest editor Teresa Northern Miller selected another facet of reform of educational leadership preparation programs that is drawing increasing attention: partnerships. Miller noted in her foreword:

University programs for preparation of educational administrators must include collaborative efforts with their communities to produce highly qualified administrators who can succeed, even thrive, in today’s conditions for schooling. Such partnerships can achieve simultaneous improvement of all the entities involved. Bringing students, universities, and communities together in conversations to develop solutions to their own problems is also supported by new research on student engagement and brain-based instruction.⁵

To that end, Meredith Mountford, in “Necessary and Sufficient Conditions for the Simultaneous Renewal of a School District and its Partner University,” traced the development of a university/school district partnership, positing that four stages and five supporting conditions made possible its success. In “Training Principals to Ensure Access to Equitable Learning Opportunities in a High-Need Rural School District,” Tricia Browne-Ferrigno and Robert C. Knoeppel reported findings from an exploratory case study of a school/university partnership, funded through the No Child Left Behind Act, that provided advanced leadership development to aspiring principals in an isolated, high poverty rural school district. Cynthia J. Norris examined the effects of a partnership between two doctoral cohorts in “The Earth Is Not Flat Anymore: Reflections on the Impact of A Rural/Urban Educational Leadership Exchange on Place-Based Instruction” where participants came to understand the difference location makes in PreK-12 education and the importance of finding a “compassionate sense of place.” In “Portfolio Analysis: Documenting the Progress and Performance of Educational Administration Students,” Teresa Northern Miller and Trudy Salsberry assessed the success of two program delivery formats, one traditional university-based and the other a district-based academy, the latter designed, developed, and delivered through a university/school district partnership.

In the final issue of this trilogy, guest editor Teresa Northern Miller, continues to explore partnerships in the preparation of educational leaders, expanding the scope from PreK-12 to higher education administrators. In “The Role of Partnerships in the Professional Doctorate in Education: A Program Application in Educational Leadership,” Susan Toft Everson describes the role of partnerships in a professional doctorate in educational leadership, presenting a rationale for the importance of including partnership experiences in the preparation of education leaders and describing a newly designed Ed.D. program’s use of partnerships to enhance the authenticity of the doctoral experience as it relates to the practice of educational leadership. Gini Doolittle, H. Mark Stanwood, and Herb Simmerman report the results of a study where professional learning communities were utilized in a educational leadership course to encourage aspiring school leaders to develop the expertise needed to support effective classroom instruction and to facilitate individual and organizational transformation in “Creating Professional Learning Communities in a Traditional Educational Leadership Preparation Program.” In “Year One of School Improvement: Examples from Nine Schools,” Stephen Gordon, Suzanne Stiegelbauer, and Julie Diehl describe the first-year progress of the School Improvement Network, an action research-based partnership that worked with nine schools to set goals and develop school improvement plans based on an action research sequence.

Turning to the preparation of leaders for higher educational institutions, Ramon Dominguez reports on the successful implementation of a distance education doctoral program tailored to the needs of practicing community college leaders in "Partnership, Preparation, and Progress in Training Community College Administrative Leaders." After only three years of implementation, approximately 60% of the cohort has earned their doctorate. Maximizing student learning outcomes is important to higher educational leaders as well those in PreK-12 education. In "Cognitive Development of Adult Undergraduate Students: Cohort and Non-Cohort Settings," Royce Ann Collins describes the result of a study whose purpose was to compare and contrast the cognitive development of adult undergraduate students across two universities; one utilized a non-cohort format similar in length to a traditional semester while the other offered an accelerated cohort adult program where students completed a three credit course every five weeks.

The collection of articles across these three issues reinforces the notion there exists across the country a vibrant education reform movement in educational leadership programs. All in all, research on the efficacy of educational leader preparation programs, at both the PreK-12 and higher education levels from ten states, representing all geographical areas of the United States, has been reported here. Studies have encompassed reform efforts in urban as well as rural school districts, including those with high student poverty. However, as Young, Mountford, and Crow acknowledged in their introduction to the first special issue, continuous improvement of educational leadership programs is essential. To that end, they call for development of a national reform agenda that includes, but is not limited to, the following: (1) partnerships with local districts and agencies; (2) attention to the economic environment, e.g., resources, financing, quality internship and private sector investment in higher education reform; and (3) state responsibility for funding, evaluating, and promoting leadership preparation reforms.⁶ Clearly, the academic success of all children is dependent upon the efforts of many, both within and outside the school building walls.

¹ See, Arthur Levine, *Educating School Leaders* (New York: The Education Schools Project, 2005).

² *No Child Left Behind Act of 2001*, 20 U.S.C. 6301 et seq. (2002).

³ Michelle D. Young, Meredith Mountford, and Gary M. Crow, "Preparing Educational Leaders: A Roadmap to Success," *Educational Considerations* 32 (Spring 2005): 4.

⁴ NCAELP is sponsored by UCEA and NPBEA.

⁵ Teresa Northern Miller, "Foreword," *Educational Considerations* 33 (Fall 2005): 2.

⁶ Young et al., "Preparing Educational Leaders."

The Role of Partnerships in the Professional Doctorate in Education: A Program Application in Educational Leadership

Susan Toft Everson

Despite Levine's recent criticism of university educational administration programs,¹ a number of educational leadership programs have already redesigned their doctoral programs in educational leadership to align with the professional roles for which students seek preparation. An important influence on these programs has been Shulman's work at the Carnegie Foundation.² In a symposium focused on findings of Carnegie's Initiative on the Doctorate, Shulman suggested that the framing definition of a doctorate is a degree given to someone who is a steward of the profession. He stated: "We need Ph.D. preparation for scholarship and Ed.D. preparation for practice. Both are rigorous."³ Current redesigned programs have created such a separation.

Although the terminal degree in these programs for educational leaders is still the Doctor of Education (Ed.D.), not the Master's as Levine recommends, the redesigned Ed.D. programs mirror Levine's call for a curriculum developed to prepare effective leaders. Even though Levine has recommended a redesign for educational leadership programs that would be the "educational equivalent" of a Master's in Business Administration, he adds additional work for those aspiring to the superintendency or other advanced positions.⁴ Most students in the redesigned Ed.D. programs aspire to the superintendency; others want system-level leadership positions such as Director of Special Education or Assistant Superintendent for Curriculum and Instruction. As such, the redesigned Ed.D. programs offer a professional degree that is similar to those in law, medicine, and business.

The intention of the redesigned Ed.D. has been to distinguish it from the Ph.D. that is preparation for scholarship while the Ed.D. program is preparation for practice. For example, the University of Southern California has established a clear delineation between the two programs in the Rossier School of Education, as follows:

The Ph.D. is research oriented whereas the Ed.D. is directed towards educational practice and the application of theory and research. The Ed.D. is equal in rigor, but different in substance from the Ph.D. Here is how: Ph.D.– theoretical

foundations of the field -- Ed.D.– development of special practitioner skill; Ph.D.– application of other foundational or related disciplines -- Ed.D.– application of other educational foundations and techniques; and Ph.D.– research which is directed toward theory building -- Ed.D.– applied research which primarily addresses localized practitioner problems.⁵

Given the purpose of the Ed.D. to prepare students for practice, what is the foundation upon which the design must sit? The new designs include components that incorporate findings from studies of effective leadership practices into a relevant program of study that includes authentic and challenging applications of the curriculum content. While recommendations regarding the structure and content of such programs are being debated, some universities have already tackled the redesign of their Ed.D. programs and are testing those designs now. Saint Louis University (SLU), like the University of Southern California, has designed and implemented a three-year professional doctorate degree in educational administration. The program includes a curriculum focused on effective leadership practices and programmatic and pedagogical formats that replicate and model experiences that students will face in educational leadership positions. One of the most important components of this program is its use of partnerships. For the purposes of this study, a partnership was defined as "one associated with another especially in an action: associate, colleague."⁶ The simplicity of this definition captures the sense of partnerships that exist in education settings. It also allows for the variety of associations that educational leaders experience every day. Most of the work of effective educational leaders occurs in partnership with others.

Waters, one of the developers of McREL's research-based "Balanced Leadership Program," identified effective leadership practices.⁷ Many of those practices occur in the context of partnerships the leader has with stakeholders in the school community. For example, leaders are engaged in partnership relationships when they "build capacity," "develop a community of purpose," and "create a condition of distributed leadership."⁸ Other scholars have reinforced the concept of effective leadership practice embedded in partnership associations. For example, in a research synthesis of principal practices associated with student achievement, Cotton found that leaders in high-achieving schools involve themselves in outreach to parents and other community members; establish and maintain a collaborative school culture; work with their staff members to share leadership and decisions; and engage staff members in professional development and collegial learning activities.⁹ All of these actions requires a partnership between the leader and others. Earlier work by Smith and Andrews offered similar findings, suggesting that general descriptions of effective instructional leaders "can be organized into four broad areas of strategic interaction between the principal and teachers: (1) the principal as resource provider; (2) the principal as instructional resource; (3) the principal as communicator, and (4) the principal as visible presence."¹⁰ Each area suggests an association between the leader and other stakeholders, fitting the concept of partnerships.

More recently, Spillane offered an agenda for lines of inquiry that address the "conversation about refocusing scholarship in educational administration in general and educational leadership in particular."¹¹ Based on his reading of the articles in the *Educational Evaluation and Policy Analysis* special issue on educational leadership, Spillane identified three themes. One theme focused on the notion that leadership exists in "collaborative, collective and coordinated" distributions.¹² These are partnership formats. Educational leaders

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manage this theme and must be prepared to do so as effectively as possible. Finally, Leithwood and Louis suggested: “We have increasing evidence that collective responsibility for student learning, in addition to improved technical teaching practices and curriculum, is a fundamental correlate of student achievement.”¹³ If this is the case, educational leaders must have knowledge and skills that give them the capacity to create cultures of collective responsibility. By definition, such work is accomplished in partnerships. Any professional preparation program that intends to model experiences that students will face when they complete the program must embed those experiences in the curriculum. In the case of educational leadership preparation, the curriculum must include a variety of opportunities for doctoral students to work in partnerships.

It is important to note here that the value and use of partnerships in education are not new, particularly organizational partnerships between universities and schools.¹⁴ Such partnerships currently exist when school districts and universities create organizational partnerships to offer leadership development programs.¹⁵ In fact, in recent years, SLU has offered several graduate leadership programs in partnership with the Saint Louis School District and other urban districts that ring the city. While these organizational partnerships may further the development of leadership education models, this article focuses on the concept of personal partnerships that educational leaders encounter on a daily basis. It is these daily, personal partnerships that influence the context in which leaders work, and it is these types of partnerships that were built into SLU’s redesigned Ed.D. program.

Program Overview

In the 1970s, SLU established an Ed.D. in order to offer a professional degree that focused on practical applications of educational leadership knowledge and skills, whose culminating activity was the completion of a doctoral project. That doctoral project was envisioned as substantially different from the traditional research-based five-chapter dissertations that were written for the Ph.D. The Ed.D. was described as follows in the 2002-2004 *Graduate School Catalogue*: “The Ed.D. Degree program is preparation for educational leadership roles through a broadly-based coursework-component and a culminating, extensive project focusing on practical needs within the major field.”¹⁶

Students’ doctoral project reports have evolved into major papers that resemble a Ph.D. dissertation although frequently the scope of the research is narrower and less theoretical. The departure from the original intent of the Ed.D. project detracted from the practical orientation of the program, and concerns about this change prompted the faculty to initiate a review of the program with the intention of re-establishing the practice-based doctoral project. At the same time, the review activity allowed the faculty to incorporate new ideas into the program design and to create program structures and formats that would replicate current experiences of educational leaders while protecting the most valuable assets of the initial program. The current debate about professional degrees in educational leadership reinforced the faculty’s commitment to the professional doctorate as a practice-based program.

The Inclusion of Partnerships

Fullan stated: “If you remember one thing about information, it is that it only becomes valuable in a social context.”¹⁷ Accordingly, leadership development programs enhance students’ abilities to value and use information in professional practice by embedding learning in social contexts. This approach requires students to engage with others— other

students, professors, practicing leaders— in educational settings while experiencing multiple opportunities for reflection and feedback. As a result of working in partnership with others, students develop theories and explanations that answer the question, “What’s going on here?” and identify practice implications and recommendations. Vygotsky’s notion that students have a “zone of proximal develop” that limits what they can learn on their own compared to what they can learn from interactions with teachers and other learners also enhanced the theoretical framework that grounded the redesigned Ed.D. program.¹⁸ The faculty was convinced that doctoral students would learn more and be able to apply what they learned more successfully if they learned in social contexts.

At SLU, learning occurs in partnerships. While those partnerships exist in formal as well as informal associations, SLU’s program design team was intentional in creating partnerships for students at three levels: students with students; students with faculty member; and students with practicing leaders. These are described below.

Partnerships Between Students: Cohorts and Project Teams. Cohorts have existed in SLU’s Ed.D. program for more than a decade. Since the cohort structure was created, the program has grown significantly. Cohorts, which consist of approximately 15 members, allow students to move through the program as a group with an opportunity to complete the program with their peers in three years, including two summers. Because students work in cohorts, they create supportive partnerships that enhance their work and encourage their success. Unlike many graduate programs in other disciplines that prepare professionals at the pre-service level, SLU’s Ed.D. program serves primarily midcareer professional educators. Cohorts whose age and experiences are similar have stimulated student-to-student support while increasing the attributes of learning communities.

With regard to project teams, the initial Ed.D. program allowed students to complete their culmination projects while also engaged in coursework. However, research topics were selected early in the program and often were unrelated to the coursework or to their future leadership roles. The projects were research-based, and the reports followed the same five-chapter outline as the Ph.D. dissertation. The oral examination was conducted after the students successfully completed the coursework and the written comprehensive examination. After the project report was approved, it was submitted to the graduate school where it was handled in the same manner as a dissertation. This approach had little to do with the goals of the Ed.D. program and created a process in which students worked in isolation, unlike the experiences they would encounter after their graduation.

Although the new Ed.D. culminating activity is still labeled a project, it has little in common with the former requirement. The most important difference is that students are required to work in project teams of three to four to over the course of the three-year program. These teams create partnerships that facilitate group learning, decision-making, and problem-solving. The faculty assesses and evaluates the effectiveness of the teams’ collaboration as well as the quality of individual contributions. Team partners select a topic that is related to current educational issues and follow one of three protocols: (1) Policy Analysis; (2) Problem-Based Learning; or (3) Product Development. Because teams work on their projects throughout their program, their projects enriched and informed by the coursework. Alternatively, team project activities often add meaning and depth to the coursework, especially during class discussions.

Partnerships Between Students and Faculty. The role of the advisor or mentor has changed with the new program design. The one-to-one relationship between a student and his or her advisor no longer exists. Each team is assigned one advisor, creating a partnership between team members and a single faculty member. In this partnership, the advisor walks a fine line between facilitator and evaluator. In the role of facilitator, the advisor asks challenging questions and provides clarity about expectations, work products, quality indicators, and resources. In the role of evaluator, the advisor assesses progress in the project and determines when the team members have successfully completed their work so that they can take their oral examination that signal the culmination of their Ed.D. program.

The faculty advisor is assigned to students after the team is formed and potential issues or topics are identified. An effort is made to match the faculty member to teams that have selected issues topics that are compatible with the faculty member's experience or expertise. The students' partnership with their advisor is reinforced through their participation in a one credit-hour course (12 contact hours) that is taught by the advisor to his or her advisees each of four semesters, beginning in the fall of the students' second year. The purpose of these courses is to discuss the teams' topics, report progress, address issues, and assess the progress of teams as well as each team member.

Before the team completes its team report and before each of the team members completes his or her individual report, the document that is used for the student's oral examination, an additional faculty member is assigned to work with the team as a partner to the advisor. This faculty member reviews the work and offers suggestions for improvements while assessing work quality with the team and the advisor. Because of the regularity of interactions between team members and their advisor, a collaborative culture is often created. This collaborative culture models good practice and can influence the associations that students have in their current positions or hope to create in new leadership positions.

Partnerships Between Students and Practicing Leaders. Project team members, in consultation with their advisors, develop Ed.D. projects that are field-based or field-focused. In field-based projects, students work in schools or districts using a problem-based learning format. Because the project is nested in a school district, many team members interact with the practicing leaders in that district. This interaction often creates a partnership in which knowledge is shared among the members and ideas are tested. In field-focused projects, project teams address issues that exist in the field, using a policy analysis or product development format. In these cases, partnerships are developed to pilot products, gather information, and test the validity of recommendations that result from their work. Whatever approach project teams choose, the process provides an experience that is both investigative and practical because of its association with practicing leaders.

Most Ed.D. students at SLU are practicing midlevel leaders who are seeking the expertise and credentials to secure a system-level position. As a consequence, team members are partnered with practicing leaders from other school districts. The nonacademic partnership that grows among these team members is valued, in part, because the students share similar concerns and support each others' career development. For example, on several occasions a team member has mentored another team member in a job search.

Educational Process Design

The SLU faculty is unified in its belief that designs for program processes should mirror the experiences that students face in school and district contexts. Practicing educational leaders do not work in isolation; rather, they are a part of a system that forces interdependence and cooperation. For example, the previous Ed.D. program, although a cohort-based program, still required independent work for the doctoral project. The faculty modified that design so that students would be required to work in teams. The concept of teaming is key to the program and is taught as part of the first semester curriculum. Larson's and LaFasto's classic text on team work is used where a team is defined as having two or more people, a specific performance objective or recognizable goal, and coordinated activity among team members to attain the team goal or objective.¹⁹ This definition guides the team development processes used during the three years of the Ed.D. program and enhances the concept of partnership through its application to project activities.

Faculty Reflections: Initial Implementation

In order to formalize the practice of reflective practitioners and to model it for doctoral students, the chair of the Ed.D. program development committee and her graduate assistant designed an interview protocol for the eight faculty who were involved in the implementation of the redesigned Ed.D. program. The graduate assistant conducted the interviews and analyzed the data and then shared the findings with the faculty. All respondents participated in the program planning process as well as the ongoing development of program elements, such as course content, student team structure, advisor responsibilities, and culminating project criteria. A majority (seven) were advisors to Ed.D. student teams, and four taught at least one course in the new program. The interview protocol, based on a force field analysis design,²⁰ was used to uncover faculty perceptions of experiences that supported or limited the new program as well as general observations about the program. Four themes related to the partnership attributes of the program emerged from the data analysis: (1) project authenticity and relevance; (2) project rigor; (3) student enthusiasm; and (4) advisor shifts. The following results were taken from the assessment report.

Project Authenticity and Relevance

Frequently, faculty noted the importance of the team structure in reflecting the reality of school leadership. One faculty member captured this notion concisely:

[The new project model] is a new way to look at a doctoral culminating activity that reflects the reality of practice. Our goal is to prepare practitioners whose careers are running schools. Their career is not focused on research. They work in teams to create change. They gather information and conduct research in teams. The reality of school leadership is not isolation.

In addition, faculty reported that as the year progressed and they began to work with teams as advisors they observed students negotiating project roles and developing project management skills within teams. One faculty member observed:

Students are forced to analyze the results of their self-management and make changes based on that analysis.

In other words, not only were students working in teams, they also were developing the skills to do so effectively.

The notion of a team dynamic was repeatedly mentioned for its authenticity related to practice as well as its role in reinforcing the rigor of team projects. With regard to relevance and authenticity, faculty responses suggested that a concern about adequately preparing school leaders for their jobs was and continues to be the driving force for implementing SLU's redesigned Ed.D. program.

Project Rigor

The issue of project rigor emerged from the interviews as a driving force behind faculty involvement and participation in the ongoing development of the team project designs. Because Ed.D. projects deviated from the established rigor of the dissertation, several faculty members indicated that prior to implementation they, and some of their students, expressed concern that a "team project" may not be sufficiently "doctoral". However, nearly every faculty member interviewed indicated that the project structure had satisfied their concerns and, based on their observations of student teams, was as rigorous as that of a dissertation. Part of that rigor stemmed from the team structure because the partnerships increased accountability. One faculty member said:

Teams talk about where they're going and come back together. They have to ask where do we want to go, where are we now, what does it mean? Students challenge each other's understanding.

Student Enthusiasm

Nearly every respondent expressed surprise at the high level of student enthusiasm for the new program. While at times there had been some ambiguity for students, as the clarity of the program design developed, they indicated a willingness to be a part of the innovation. Faculty members speculated that this willingness was due, in part, to an initial sense that working with others on a team project might be easier than a traditional dissertation. However, over time, students recognized the value of the projects to their development as a leader. Without this component, the partnerships would not have been successful.

Advisor Shifts

The final theme that emerged from faculty interviews pertained to shifts faculty had to make in their role as advisors. One interviewee stated:

Advisors [of teams] need to be proactive rather than reactive. Faculty members need to establish a process with teams for getting the group going and setting benchmarks.

Another commented:

It is not going to be easier for advisors. Being a team advisor is more like having a dialogue. We have to help students learn strategies to behave better as team members.

In short, the relationship between advisors and students was more collaborative.

Faculty members were learning to function in a different capacity as team advisors rather than advisors of traditional students. Most importantly, they had to learn to "look for team work." Because teams' partnership interactions were an essential aspect of the culminating project, team advisors were in the best position to assess the quality of that interaction. One faculty member cautioned:

We need to identify measures to determine if teamwork is happening. Advisors must watch for and know what to look for in terms of teamwork.

These shifts in the advisor role became clearer at the end of the first year, but some faculty were still concerned that they were not well prepared to perform these new duties. As teams progress through their project work, and especially as the first cohort approaches the oral examinations, the capacity of the advisors to work with teams will be a pressing need.

Conclusion

This article presented a rationale for building partnerships into professional doctoral programs in educational leadership and a description of Saint Louis University's use of partnerships in its redesigned Ed.D. program. Although the program has been implemented, it continues to be a work in progress because of the underlying assumption that the faculty represent a learning community engaged in a problem-based learning project that focuses on the preparation of students for leadership roles in education. The current debate about the quality and scope of educational leadership preparation programs provides a rich context in which to do that work. The debate offers criticism as well as recommendations for improvement that influence the faculty discussions, program revisions, and accountability approaches that are essential to successful outcomes.

Currently, the faculty is engaged in a program review and has organized into small work teams to address three main areas: (1) accountability and quality assurance; (2) students' experiences from the beginning to the end of the program; and (3) faculty experiences and roles in the program. Fortunately, a collaborative culture exists within the department. The interview process used during the initial program assessment made clear how important this culture is. The analysis of interview data suggested that there was broad agreement among program faculty that the culture of the department contributed significantly to their willingness to both innovate and collaborate. Faculty members attributed this, in part, to the problem-based learning approach taken to develop the new Ed.D. program, and, in part, to the simple fact that "We like and respect each other." Several members cited the fact that the department is safe for risk-taking and for, what one interviewee called, "warm, positive confrontation." In this program, the collaborative and collegial culture has been a driving force for a program shift of this magnitude. This culture, based on partnerships among faculty members who have produced the new program, will support a continuous improvement effort to prepare effective and successful educational leaders.

Endnotes

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Creating Professional Learning Communities in a Traditional Educational Leadership Preparation Program

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During its 50-year history, the University Council for Educational Administration (UCEA) has witnessed both the development and subsequent demise of innovations in leadership preparation programs. Its relatively brief history also suggests that when new management strategies or instructional innovations, e.g., cohort instructional models, appear, we embrace them with enthusiasm, relying almost exclusively on anecdotal reports for determining program success.² Deeply embedded in such “groupthink” are assumptions that with each new iteration we automatically refine our theories and in the process, extend our capacity for critique, and thus substantiate assertions about what works and what doesn’t.^{3,4} Multiple scholars, including McCarthy and Murphy, have attributed this phenomenon, in part, to the fact that educational leadership preparation lacks a knowledge base defining a “commonly accepted, specialized body of knowledge that involves intensive, often lengthy academic preparation.”⁵ By simply accepting as effective that which is current or popular rather than institutionalizing our reliance on systematically gathered empirical evidence Malen posited: “...many professors believe their instructional practices and structures are *innovative*; however, these approaches may actually represent *prevalent* practices, which have become generally accepted within the field...Cohorts are one such example. Mentoring for novice and aspiring principals...is another practice dominating the profession.”⁶

Others have claimed that what we describe as the “the wisdom of the field” represents little more than our current theories-in-use or descriptions of our existing practices.⁷ English extended this criticism by pointing out how the accreditation processes proffered by the National Council for the Accreditation of Teacher Education (NCATE), the National Policy Board of Educational Administration (NPBEA), the Educational Leadership Constituent Council (ELCC), and Interstate School Leaders Licensure Consortium (ISLLC) perpetuate the belief that our current assessment efforts automatically translate into self-correcting cycles of ongoing program improvement. Miskel

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characterized the proliferation of these assumptions as “rationalized myths,” pointing out that standards and accreditation hardly guarantee students’ acquisition of the knowledge, skills, or dispositions for becoming effective school leaders.⁸ Further, Stakenas claimed that reform strategies amount to little more than the renaming of existing courses rather than reorganizing or restructuring existing preparation programs.⁹ In addition, Schmoker contended that such superficial tinkering results in programs that cannot support their claims for student learning.¹⁰

Purpose of the Study

One contemporary strategy for reform, professional learning communities, encourages aspiring school leaders to develop sufficient leadership expertise to support effective classroom instruction while, at the same time, facilitating individual and complex organizational transformation across numerous stakeholder constituencies. Leithwood, Louis, Anderson, and Wahlstrom consider effective leadership to include visioning, building capacity, and improving the conditions of the organization.¹¹ Advocating for parallel district policies that provide critical support to teachers, administrators, and students, they claim that effective student learning requires both focused instructional leadership and a supportive professional community environment. Leadership then becomes the catalyst in implementing and institutionalizing coherent change.

In this article, we examine the prerequisites for leadership preparation programs with regard to implementing and institutionalizing professional learning communities as an instructional strategy. First, we posit that as faculty we must examine and reflect on our own teaching practices and how they influence our reciprocal relationships with students. Second, we argue that capacity for individual and collective student voice must be developed, invited, and applauded in preparation programs. Finally, we suggest that students’ newly mastered competencies must be institutionalized as part of an ongoing and systematic analysis of our teaching practices.

The opportunity to study students’ reaction to a collaborative learning community environment arose from the unexpected lower-than-normal enrollment in two required core courses in a traditional leadership preparation program. In order to provide students access to the required courses, two sections totaling 24 students were combined into a single large section. After late registration, the course enrollment soared to 38 students. Although the department typically did not allow class size to exceed 25 students, that semester, two senior faculty members were experimenting with coteaching a research class enrolling a similar number of students. By engaging in a coteaching model, the two faculty intended to modify instruction in a way that would meet the diverse learning needs of the large group. This seemed like a reasonable option as the program prepared to undergo revisions to align program offerings with new licensure requirements. It was relatively easy then to construct an argument for a second large group instructional effort. A critical difference, however, was that our class would employ small learning communities as the core instructional strategy rather than the more traditional instructional lecture strategy planned for the other course.

Literature Review: The Current Challenge and Implementation of Innovation

Demands for increased accountability can be found throughout every facet of school operations, leaving schools scrambling for ways to demonstrate improved student performance. At the same time,

schools must invent and provide structures, including contracts and policies, that support meaningful transformation. One such structure emerges out of Dewey's vision of schools as learning communities,¹² with similar notions of schools as centers of inquiry¹³ learning academies,¹⁴ and learning enriched environments.¹⁵ In practice, the concept of schools as learning communities suggests that learners and their learning are reflected in the core technology of schools-teaching and learning.

In learning communities, instruction moves from a transmission or banking model of instruction¹⁶ to a constructivist orientation where teachers establish appropriate learning conditions rather than simply communicate the knowledge embodied in our mental models,¹⁷ resulting in a shift to student as learner, thinker, and doer with teachers and administrators modeling identical efforts. Underpinning constructivist pedagogy is the belief that students who assume responsibility for their own learning can master and make better sense of the world with their motivation for learning moving from the extrinsic to intrinsic.¹⁸ Such learning communities assume high levels of program coherence where curriculum, instruction and technology inform the assessment and evaluation process,¹⁹ and thus become a lens for organizing learning experiences.²⁰ With learning goals solidly grounded in the research and the profession's multiple knowledge bases,²¹ thematically-based programming is facilitated by both practitioners and their various partners in learning.²² These integrated and complementary strategies facilitate integration of program elements, allowing assessment efforts to be compared against a coherent vision of what ought to be, and contribute to the building of individual and group capacity.²³

Leadership for schools constructed around collaborative efforts requires distributed leadership rather than top-down management models that demand compliance rather than develop commitment to goals that celebrate "the dignity and worth of self and others; that fosters the empowerment of both, and that encourages and support the maximum development of human potential for the benefit of the common good."²⁴ A second tenet underpinning learning communities is an ongoing practice of reflective decision-making relying on mastery of subject matter and pedagogy; orientation toward regular use of informed inquiry; ongoing across-the-board assessment; openness to diverse views and critique; and a firm commitment to lifelong learning.²⁵ Consistent with the hard work required for continuous improvement, reflective practice also underlies collaboration through double-loop learning and expands our understanding of community.²⁶ Unhindered by a school's physical boundaries, expanded learning communities include parents, families, and community members, making the expansion of the critical nature of the academic, social, personal, and social justice functions of schooling possible.²⁷

Joyce acknowledged multiple shortcomings in current professional development initiatives.²⁸ Developing the collaborative inquiry required for professional learning communities requires a certain mastery of implementation skills. With strategic planning, team teaching, the middle school movement, and whole school reform programs falling short of expectations for transforming the learning environment, Joyce reiterated that teachers sit at the center of reform and require ongoing assistance "concentrating on one high-quality strand at a time, with the content a part of a curriculum or a teaching strategy that will enhance the learning of the students...Connection to the knowledge base is very important."²⁹ He concluded with the assertion that ultimately schools must reflect on purpose and

process. Stated another way, what is most important is how schools systematically study data gleaned from the improvement process and apply that knowledge to improving student learning.

Additionally, opportunities to make sense of program innovations are key to implementation. Attempts to shortcut this process may result in the premature and false clarity described by Fullan and the untimely demise of reasonable strategies for preparing school leaders.³⁰ If Cuban was correct about our penchant for reform,³¹ and if Achilles' argument about implementation rings true,³² then perhaps Doolittle and Barnett were correct in their suspicion that persistence in confronting and struggling with the uncomfortable and messy issues involved in the implementation process may be reasonable predictors of future program success.³³

Method

Our first major problem surfaced as we sought suitable classroom space for 38 students and 3 instructors. Adequate classroom space was practically nonexistent in the aging 1970s building, and other suitable instructional areas throughout the campus had long been committed to other courses. Although more appropriate learning space was made available off campus, moving the location of the class was not approved. Fortunately, our knowledgeable department secretary persuaded another department to open their social sciences laboratory for our class. Happy to secure a room large enough to accommodate the entire group and excited that the classroom offered tables and chairs rather than the usual supply of clumsy college classroom desks, we realized that its size and organization would still constrain the small group instruction we intended for collaborative learning.

As course instructors, we were concerned about our ability to facilitate expected student-learning outcomes without a little more time to consider other instructional strategies. Further, in order to manage the number of students, provide adequate support to the small groups, and find time to address the learning needs of the diverse learners enrolled in the course, a doctoral research assistant was recruited to support the learning process. Beginning to help organize students into small learning communities of six to eight self-selected individuals, the assistant established as his priority to meet with students, individually and in small groups, during and outside of our regularly scheduled class time. Determining through individual and small group conversations that course participants lacked mastery in the writing process, it was soon clear to us that they also lacked the core content knowledge and skills outlined in the Interstate School ISLLC standards. Overall, course participants barely reflected entry level knowledge and expertise.

In a quick reassessment of our original course goals, we agreed that students would need to complete all course requirements in order to demonstrate the learning outcomes outlined in the syllabus. Nevertheless, we did elect to negotiate with the students to modify some assignments to increase efficiency. Course requirements originally included a 20 page organizational analysis, a book review, a small group oral presentation, and a ten minute presentation of a leadership platform. After some discussion, we shortened the requirement for organizational analysis by several pages and limited platform presentations to eight rather than ten minutes.

One assignment that remained unchanged, however, was the requirement that all students submit at semester's end a four to six page learning reflection. The assignment asked students to consider what they had learned and how they were applying this knowledge

to their current professional practice. Students were also assured that the assignment would not be calculated as part of their final course grade. Moreover, in an effort to model a safe learning environment, we advised the class that we would not read these reflections until after course grades were recorded. We were confident that we would receive honest and candid responses from students about the nature of their learning experiences. In fact, during the past three years, all department members had adopted this innovation.

Initially, the purpose of examining students' course evaluations was to provide an additional set of student-generated feedback to the department as they updated the existing leadership program. With the state's recent adoption of the ISLLC Standards for leadership preparation programs, we anticipated that our program was going to require substantial revision in order to receive reaccreditation. Learning reflections were also selected for analysis because we believed that they operationalized the constructivist philosophy underpinning our own instructional leadership beliefs. Typically, this assignment provided us with rich insights about how students acquired mastery of course content and applied competencies in their professional practice. Second, although we acknowledge that this assignment might represent another round of self-reported anecdotal data, the fact that data were collected from students by a majority of faculty during the past four years attested to its value. Moreover, the stipulation that the learning reflections were ungraded and were not read until after course grades have been submitted consistently produced richer and more meaningful data than the traditional course evaluation process required by the department and the college. Most faculty in the department had come to recognize that this particular heuristic encouraged students to offer authentic feedback and to engage in metacognitive strategies about their learning experiences without fear of affecting their grade.

Data analysis paralleled course rubrics and the process of systematic inquiry. All data were coded using the open and axial techniques developed by Glaser and Strauss and grouped into themes.³⁴ Themes were subsequently organized into major categories for further analysis. Selective coding was accomplished after faculty reviewed data pointing to practices for improving the instructional process in a large group instructional format.

Findings

We believe that our original goal of implementing a learning community environment in a traditional leadership preparation program was successful for several reasons. First, students indicated that the learning community model provided a safe learning environment with a high level of trust established among learners. One student remarked:

The fact that the professors allowed freedom to express feelings and situations in a trusting atmosphere definitely altered the environment.

Another student wrote:

I was absolutely amazed to see how some people opened up and shared personal experiences with the class.

For several students, the coteaching effort provided an important role model and bridge between students and the instructional team. Indicating that a majority of the instruction they received in the traditional preparation program left them bored and disengaged, they described themselves as "passive learners".

A recurring theme in the data was how our modeling active listening contributed to their membership in the class learning community. One individual indicated:

The most important thing...was to always listen to others... [and] make sure that people feel and know that they've been listened to.

Understanding that relationships are the building blocks of a learning community and that dialogic communication functions as a key mechanism fostering relationships, they expressed increased understanding of the collaborative learning process:

It was an amazing combination of qualities. Each one of us did our part within our learning community, and it made us strong.

Constructivist theory emphasizes the value and importance of student voice during the learning process. As we continued to analyze the data, it became apparent that the learning reflections provided evidence that students themselves were learning to value voice within the learning community. One student stated:

I learned that if I relaxed and really listened and observed my group members, our sessions together went better... and getting everyone's opinion often led us to a new place.

Second, the course format promoted students' discovering and exercising voice in the learning process and highlighted the importance of our listening to each student as a prerequisite for engaging them in the learning process. We discovered early in the semester that for some students this course was intimidating simply because it was their first graduate experience. Several students shared their feeling of being surprised and somewhat unnerved to discover that the course deviated significantly from the traditional educational setting they had come to expect during their undergraduate programs. Another group of students expressed their reservations about the learning community format:

I am used to writing papers and reporting data. I have worked many times in groups, and usually it is an unpleasant experience....

Finally, several students expressed surprise as they considered the learning outcomes expectations listed in the syllabus. To them, acquisition of the knowledge, skills, and performances associated with the ISLLC standards seemed virtually impossible to understand, much less master in the absence of traditional classroom strategies.

Predictably, most students assumed that the course structure would incorporate a hierarchical relationship between student and instructor following a teacher-as-knowledge dispenser model of instruction. Not anticipating opportunities for student dialogue, one individual noted:

This class offered a certain freedom that I had never experienced in a class. Students were welcome to express their opinions and engage in the class. At times, it almost seemed like a large group of friends had gotten together to express their concerns or troubles about work.

Another student stated:

What I will always remember about this class is the way the class was taught. We learned a lot more by teaching ourselves, and one another, than we could have by listening to someone lecture.

As we completed our analysis, the data provided ideas of strategies for improving instruction for large groups of students. Although some students complained about the classroom space, almost all reported mastery of course content and insights consistent with a disposition toward transformational leadership.³⁵ Preferring similar interactive environments for future learning, students expressed surprise about the amount of knowledge acquired during the semester. Explaining that they had initially expected to sit and learn without having to expend much time or energy, their learning reflections confirmed our belief that an enhanced understanding about their individual values and beliefs was a critical factor in helping them identify that they did, in fact, want to become school leaders. Students related how they looked forward to meeting with their small learning community each week. Finally, they described how multiple opportunities for clarifying course materials and objectives was helping to shape their current professional practice in spite of what we would describe as abysmal conditions in many local school districts.

Learning communities helped students work through the enormous content associated with the course and to work through what they described as ambiguity. Many of the student reflections echoed their initial reluctance to engage in the learning community process. In one learning reflection, a student noted:

I was rethinking my decision to go back to school...on our first night of class.

Several students expressed frustration with the ambiguity of the instructions regarding the course assignments, particularly creation of learning communities. Students articulated their struggles in trying to develop effective learning communities:

The members of our group worked very well together. This happened progressively over the course of the semester. The first time we met... I wouldn't say that the group gelled.... We were polite to each other and yet distant. We managed to move forward with our assignments, but initially working together seemed forced.

The learning community environment provided students with an opportunity to engage in the learning process in a new and challenging way. One student wrote:

Through our interactions we were able to teach each other...Even when someone thought they were 100 percent right about something, there was always another way to look at the same problem. This experience was quite humbling.

Socialized to be passive learners, students expressed surprise at their success in completing the work and, more importantly, at the knowledge and skills that they acquired during the semester.

Equally critical to successfully engaging students were the tutoring sessions made available to all students. Offered by the graduate assistant, this led to our most important insight. A newly matriculated student stated this best when acknowledging appreciation for the support offered her:

I was out of this class in body, mind, and spirit after one night. But, you cared enough to pull me back in.

Overall, we observed greater risk-taking among students expressed through increased and more extensive vocal class participation after consultations with the graduate assistant. For these students, the learning community, by itself, did not automatically constitute a safe environment for learning.

Individual conferences with the graduate assistant were characterized by his modeling active listening and unconditional positive regard for each student. With students indicating their insecurity about their knowledge of leadership theory, first, they were encouraged to discuss their understanding of the course material as it related to their practice, and then personal work experiences were used to analyze leadership theory and organizational structures. Dialogue with the graduate assistant centered on personal experiences and enabled students to explore their particular role within their organizations. Students were also encouraged to consider how the insights gleaned from their organizational analysis might contribute to local leadership and change initiatives.

Adding individualized support was necessary in order to fully engage them in our constructivist learning strategies. For example, one student shared:

I was afraid that I was going to look foolish in front of the class because they are all teachers and have so many good ideas.

Citing the graduate assistant as non-threatening, students expressed a willingness to be more open or vulnerable with him. One student expressed relief that he was able to voice his concerns about diversity issues, and he later shared his views openly with the rest of the class. The initial reluctance of some students to be more public directed us to consider the notion that in order for students to participate fully and engage in the learning process faculty must encourage students; accept where individuals are as learners; and develop multiple strategies to engage them in the learning process. In short, our initial efforts to create a sense of safety fell short of the mark. Students still perceived the class environment as a potentially judgmental and, hence, threatening. We observed that the additional individualized assistance provided by our graduate assistant helped students gain the required sense of the self-efficacy so crucial for adult learning.

Our initial assertion that student participation was the cornerstone of our learning community strategy did produce active participation by most students. Actively engaging all students in a meaningful way, however, required them to make an overt personal investment and to be willing to be vulnerable in front of multiple audiences. Students were encouraged to discover new personal attributes and, at the same time, relate to course materials. Thus we were able to convey that success in this course transcended the mere acquisition of facts. One student put it this way: "Self-discovery had a place in leadership." Many of the students recalled personal growth experiences, and one student wrote:

I think I have learned more about myself during this semester...I was challenged personally and forced to explore myself.

In addition, students shared that the emphasis on relationships within the learning community provided experiences that carried over into professional practice. One student revealed:

All of a sudden I felt connected to everyone in my school... [and] I developed a great relationship with my new principal [by] talking to her....

Although we intentionally modeled unconditional positive regard for students' ability to learn and process the core content, the graduate assistant, emphasizing the instructor's shared belief in students' ability to master the work, was the key factor in students' reporting

feelings of increased support and safety. One student wrote in her learning reflection:

I think it is wonderful that you are concerned with making sure all students are successful with each assignment.

Secondly, our approach motivated individual students through empathy, active listening, and content knowledge. One student reported:

feel[ing] more at ease offering opinions within small “family like” discussion groups [that provided] opportunity to get to know the people in the class on a more personal level.

The challenges students faced in the learning community environment required a strong safety net to ensure that they felt comfortable. We were encouraged by the following comment:

I asked for help, accepted it, and received it. I am grateful.

Because many students seemed uncertain about their ability, our subsequent reassurance was an important contribution to their recognizing potential future success as learners and leaders. One student put it this way:

You sent courage, compassion, strength, and helped my way.

The modeling of unconditional support that carried over into learning community groups was valued by some students who indicated:

Class size was much less of a threat as soon as we became ISLLC [group] #1.

One student wrote that the support received from group members served as a “strong tool” that made success possible. Students’ fears diminished as they:

...had the opportunity to meet many different people who have shared similar situations and struggles [they] have experienced.

This benefit was expressed by a student who acknowledged:

Peers in the class and the professors have helped me sort out many things that have confused and frustrated me in the past.

Discussion: Implications for Practice

As an instructional team, we were confident about the potential benefits to be derived from enacting a learning community despite the obvious enrollment management issues. Of course, we were a bit intimidated by the large number of students and incompatible classroom structure. Yet we anticipated that our intentional trust building, extensive strategies for communication, and efforts aimed at creating space for multiple layers of collaboration would successfully facilitate a collaborative learning experience for all our students. On a regular basis, we reminded one another of the value in modeling skillful participation, and we intentionally engaged in practices including asking the kinds of probing questions that we hoped would promote students’ desire and capacity for examining their mental models. Sometimes, we were silent, hoping to encourage voices to surface by converting a student or faculty concern into a question to be answered by anyone in any group. Finally, we were deliberate and consistent in our efforts to model the leadership and collaborative behaviors we wanted to see in our students.

Data from course evaluations and learning reflections documented that although students were apprehensive about the classroom and its configuration, the instructional strategies, or their lack of experience in graduate courses, by semester’s end they reported acquiring

sufficient confidence to engage in an interactive learning process. Underpinning their newly acquired level of confidence, they stated, were the multiple opportunities to engage with our graduate assistant and us in individual and small group situations.

With the profession’s current focus on the importance of instruction, our analysis directs us to Burns’ recent discussion of transformational leadership.³⁶ Uncomfortable with the many adjectives that obscure the complex realities surrounding enacting school leadership, we concur that recent demands for accountability and second-order change mediate against leadership being invested in single individuals. Burns argues persuasively that good leaders are easily identified: they build capacity in others rather than engage in quick-fix strategies with them positioned squarely at the center. Subsequently, aspiring school leaders must begin somewhere, and we contend that the intentional sharing of leadership tasks is a good place to begin. However, such a challenging mission requires, at minimum, good role models and opportunities to practice and encode the triad of knowledge, skills, and performances in long-term memory. Although we are, in fact, emergent leaders ourselves, we understand that we must intentionally develop leadership capacity in others. Therefore, our goal to tap into this potential leadership capacity in each of our students emerges from our collective belief that it is incumbent on us as leaders of future leaders to initiate the process.

Toward this end, such intentionality rightfully begins first with an examination of our own teaching and then careful reflection of how we do what we do. Next, leadership preparation faculty must carefully consider how their individual values and beliefs influence our interactions with students. Put another way, we believe that those who work in leadership preparation programs must conduct themselves as leaders. It is insufficient for faculty to simply “talk the talk.” Authenticity and, hence, building trust requires us to “walk the talk.” Moreover, as we develop our own capacity for reflective practice, we learn to identify the limits and boundaries of our teaching efforts and thus target areas for improving both our teaching of and relationships with students. We acknowledge, however, that recognizing needs in ourselves or in our students is insufficient to leverage the deep change required to transform education. We argue that developing reciprocal relationships between faculty and students are key to this transformation. In practice, this requires both individual and group reflection about shared sense of purpose, engagement in collaborative work, and accepting joint responsibility for creating and maintaining learning community. In summary, our results, although still quite preliminary, point us to the value of guiding multiple stakeholders in working toward common ends and purpose. We posit that our efforts establish an important scaffold for the reciprocity and empowerment that transforms how we enact our profession in schools and in the academy. Learning reflections allow students to be clear about how their learning preferences and experiences shape their practices. If we are comfortable with the argument that reflective practice is important to effective practice, how then can we reject self-reports of those we purport to serve? As adults, we have come to believe that we can trust our students to articulate their requirements for learning.

As we continue to ponder these findings, we are struck with the synergy and creativity unleashed by this mutual self-actualization. Classroom observations support our claim that the learning community environment we created in our cramped, noisy classroom

resonated with students' needs and wants. Students' capacity for exercising voice enacted through increased self-efficacy was evident in learning reflections and course evaluations. In sum, we were inspired by Heifetz's argument that leadership requires us to take sides rather than defer to a *lassies-faire* approach to teaching and learning.³⁷

Conclusions and Recommendations

Armed with data sets from previous course evaluations, we were certain that, despite an unexpected and extraordinarily large class, inviting student feedback would help us to further improve our instruction. To some degree, we had already realized that as our own expertise grew, we were willing to undertake new challenges. This confidence, in turn, mirrored our willingness to engage in what some might term risk-taking behavior.³⁸ Although we considered the possibility of failure, it seemed like a vague menace at the time. In our own way, each of us envisioned ourselves as a special kind of instructional rebel determined to make this course work for students.

Literally sharing the good, the bad, and even the ugly, we rethought, regrouped, and revised after each class. Wedded to collaborative learning, our confidence level remained high throughout the semester. Our own expertise had grown in recent years because others had taken the time to listen to us. Now we were determined to model this for our class. Cognizant of the research rhetoric, we applied instructional techniques intended to duplicate differentiated instruction. Despite these efforts, the factor that made the greatest difference was our collective effort to listen to all students, promoting their confidence as learners. Avoiding the somewhat predictable tendency to rely on the vocalists (those who sometimes dominate class discussions), we intentionally and systematically sought conversations with all learners, seeking ways to facilitate their learning. It was in this attempt to recruit each course member to active-duty that we discovered the power underpinning learning community. It was a graduate student who made it all come together for us. We discovered, albeit a bit backward, the importance of building an environment where mutual self-efficacy was empowered.

It's entirely possible that we are merely reporting what experienced veterans have known for years. What has been missing from the research and knowledge base, in our view, however, has been sufficient literature explicating the prerequisite steps to self-discovery as instructor and mentor. With our deepest apologies to Parker Palmer, we lament the failure of leadership preparation programs to have us begin at the beginning...with the fire in our soul.³⁹ Frankly, while some of our work initially bordered on the intuitive, we acknowledge the efforts of others whose work continues to inform our attempts to become reflective practitioners. We found Osterman and Kottkamp's essential elements for a successful cooperative learning environment profound, but challenging: (1) safety, so people feel comfortable as they contribute; and (2) equity, so everyone has an opportunity to participate.⁴⁰ Inherent in the equity standard is a set of explicit values shared by faculty and members of the class. In closing, it seems obvious to us that with leadership preparation programs across the country retooling to meet the new ELCC/ISLLC standards, we need to exercise considerable caution against any sort of programmatic tinkering without first examining the shared values and beliefs that trigger modifications to current course offerings. Such first order thinking simply reproduces past practices.⁴¹ By challenging existing norms, planning our approaches, acquiring new ways of thinking, and, ultimately, new sets of skills and values, we

focused our efforts at building capacity for second order change.

In sum, we now recognize how our constructivist roots obviated our previous practice of relying on the vocalists to generate classroom excitement, energy, and engagement. Such practices seem indicative of naïve beginning teachers. Finding ways to engage all learners seems more reliable but takes considerable time and expertise to enact. We have a growing confidence that learning communities can be successfully developed in both traditional and nontraditional leadership preparation programs. In the process, we acknowledge that we are learners, still.

Endnotes

¹ Acknowledgements: The authors would like to express their gratitude for the help and guidance of Ellen Trombetta in preparing this manuscript.

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Year One of School Improvement: Examples from Nine Schools

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School improvement research asks the question “How do schools improve over time?”² and thus is focused on school culture and the change process.³ A growing body of research has identified characteristics of improving schools, including democratic leadership, consideration of school context and culture, shared vision, external and internal support, a focus on teaching and learning, ongoing professional development, dialogue, collaboration, collective inquiry, and data-based feedback on improvement efforts.⁴

In many schools across the nation, schoolwide action research has become the primary vehicle for integrating the various aspects of school improvement.⁵ Unlike many popular school improvement models that require participating schools to accept particular assumptions, goals, and practices, action research allows the school to set its own improvement goals and design its own improvement plan based on identified needs. School improvement and schoolwide action research merge when administrators and teachers— and often parents and other community members as well— agree upon a focus for school improvement, gather data on the focus area, set data-based school improvement goals, develop a collaborative action plan for meeting those goals, and gather evaluation data in order to measure progress and revise the action plan.⁶ In doing so, as Allen and Calhoun noted: “...action research places disciplined inquiry (i.e. research) in the context of focused efforts to improve the quality of the school and its performance.”⁷

The use of action research as a vehicle for developing the capacity of schools to deal with change is not new. Sixty years ago, Lewin wrote about the power of action research to transform “...a multitude of unrelated individuals...into cooperative teams...to apply honest fact finding, and to work together to overcome (difficulties).”⁸ A number of universities have sponsored various forms of university-school partnerships to support schools in action research endeavors. Allen and Calhoun reported results from a six year study of a group of 100 schools in Georgia and 11 in Iowa that had made a commitment to conducting schoolwide action research. As a result of this study, Allen and Calhoun stated that while action research in schools

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is difficult and complex, it can provide the focus and direction to make change happen. Based on their findings, they recommended the following as important to sustaining improvement efforts:

- Substantial, ongoing opportunities for group vision building and reflection on progress;
- Actions taken need to improve the culture of the school as a whole and should not be viewed as separate from the mainstream life of the school;
- Schools need support around the issue of time, specifically, time to plan, time to implement, and time to see results;
- Schools ideally would interact and exchange ideas with other schools involved in similar processes;
- Ongoing technical assistance when teachers need information to find solutions.⁹

A contrasting study by Peters involving 14 universities and 100 schools across Australia conducted over the final eighteen months of the project found that while teachers reported growth in their understandings about teaching, learning, and change, and showed elevated self-esteem from working on the project, they were limited in their ability to make change beyond the domain of individuals or clusters of classrooms. The teachers in Peters’ study saw the most significant outcome at the school level to be greater involvement of staff in professional development and recognition by administration of the need for teachers to have time for reflection. Peters’ data suggested that the lack of schoolwide change was a result of involvement by small groups rather than the whole school; resistance built into the school culture; staff turnover; and the loss of critical leaders. Similar to many of the findings in Allen and Calhoun, Peters discussed the need for time and reflection, structures for shared learning, clear strategies for evaluation and feedback on process, and, importantly, clarity about expectations and what constitutes results to support a sense of achievement in the process.¹⁰

Our study described the first-year progress of an action research-based school-university partnership called the School Improvement Network where nine schools from different areas of central Texas worked with university facilitators to set goals and develop plans based on an action research sequence. Each school had a unique context in terms of location, population, size, and needs. A number of the schools had new principals and saw this effort as a way to get to know one another; other schools were seeking a different way of thinking and doing around the issues of capacity development and problem-solving. Consistent with the recommendation made by Allen and Calhoun, the School Improvement Network made a conscious effort to build in time to develop group vision, work, reflect, and share across groups, as well as seek out technical assistance.

The School Improvement Network

The School Improvement Network is a school-university partnership sponsored by the National Center for School Improvement (NCSI). The Network includes Texas State University and K-12 schools from throughout Central Texas. The Network is based on four principles:

- School improvement is continuous renewal, not a single reform or event;
- Inquiry as habit of mind is essential to school improvement, and it includes questioning current practices and seeking data-based ideas about improvement to be made;
- Collaborative vision building, curriculum development, professional development, and action research are core strategies for improving schools;

- All individuals in the school organization need to learn, teach, and lead. Formal leaders must be facilitators able to stimulate and develop the abilities of educators, parents, and students.

Each Network school appoints a school leadership team consisting of the principal, three teachers, and a member of the school community. The leadership team is responsible for facilitating the involvement of the entire school community in long-term action research focused on whole-school improvement. The leadership teams come together periodically for university workshops that include training in data gathering, planning, and facilitating professional development. The workshops also provide teams with time away from their hectic school lives to reflect, plan, and assess their school improvement projects. Finally, the workshops allow teams from different schools to share information, successes, problems, and solutions.

In the first year of Network membership, each school is charged with selecting a focus area for school improvement, gathering data to better understand the focus area, and designing a data-based action plan for school improvement. The action plan format calls for school improvement objectives, improvement activities, and a plan for gathering data to assess the progress of the action research. At the end of the first school year, each school is asked to assess its progress toward meeting improvement objectives and develop a revised action plan to be implemented the following school year.

Throughout the action research process, critical friends appointed by NCSI visit each Network school to provide on-site assistance. Critical friends are professors or practitioners with expertise in the school's focus area. Additionally, students from Texas State's graduate programs in educational administration and school improvement are available to assist the schools with literature reviews, data gathering, and data analysis. Finally, NCSI provides Network schools with small grants to help cover expenses for released time, professional development, and the purchase of curriculum and instructional materials.

This study reports on the process and outcomes of schoolwide action research by nine schools in their first year as Network members. The participants were a blend of urban, suburban, small town, and rural schools in Central Texas. The participants included three high schools, one middle school, and five elementary schools. Five of the schools either met or were within a few percentage points of meeting Title I requirements for designation as disadvantaged schools. One of the high schools and two of the elementary schools were in their first year of operation.

Purpose of the Study

The study consisted of separate case studies of the first year, or start-up phase, of the nine schools' long-term action research projects, as well as a cross-case comparison of school improvement efforts. This article reports on the cross-case comparison. Focal points of the case studies and cross-case comparison included: (a) how the schools organized for action research; (b) the role of data gathering and analysis; (c) the schools' action plans; (d) early implementation; (e) level of involvement and collaboration by members of the school community; (f) the School Improvement Network's role in facilitating action research; (g) leadership during the action research; and (h) early effects on the schools, educators, and students.

Research Methods

Data gathering included interviews with school administrators, teachers, and critical friends. Interview questions were open-ended and paralleled the study's focal points. Participants also completed a survey including 23 fixed-response items with Likert-type scales and four open-ended items. (See Appendix.) The quantitative part of the survey included sets of questions on collaboration, planning, implementation, assistance from NCSI, and effects of the action research. Open-ended questions asked participants about challenges, positive experiences, learning, and change during the action research. Additional data gathering methods consisted of field observations; development of school action research profiles based on participant self-ratings on an action research rubric; and collection of archival data, including school demographic data, student achievement data, action plans, program evaluation data, and year-end action research reports. (See Figure 1.)

Interview transcripts were coded using the constant comparison method. A series of data displays were developed, summarizing interview data for each of the study's seven focal points. These data displays allowed us to compare perceptions of administrators, teachers, and critical friends within each school as well as to compare perceptions of leadership teams across the nine schools. Review of data displays helped to identify common themes, sub-themes, and outlying perceptions within and across the teams. A similar process was used to compare responses to open-ended survey questions.

A review of the qualitative data discussed above led to tentative identification of two types of schools in terms of their first-year of action research: "Starters" and "Wheel Spinners." Quantitative survey responses and participant ratings on action research rubrics were used as a check on tentative conclusions. Independent group t-tests were conducted on survey responses of educators from schools classified as Starters and Wheel Spinners. Also, rubric ratings from the two types of schools were averaged to allow comparison of composite profiles of Starters and Wheel Spinners. Field notes and archival data gathered during visits to the nine schools were reviewed to provide additional context and verification of results.

Results

A significant result was the identification of two types of schools in the start-up phase of action research. Starters were schools that had more involvement and collaboration in action research among teachers outside the leadership teams, were effectively implementing their action plans by the end of the first year, took advantage of their critical friends' offers of assistance, and experienced more positive effects by the end of the first year. Wheel Spinners had less participation and collaboration, had more difficulty getting organized, gathered fewer types of data, had difficulty implementing their action plans, and did not report as many positive effects as the Starters. Six of the participating schools were classified as Starters and three as Wheel Spinners. We report results here under headings corresponding to the study's eight focal points. Common results as well as differences between Starters and Wheel Spinners are described under each heading.

Figure 1
Schoolwide Action Research Rubric

	Stage 1	Stage 2	Stage 3	Stage 4
Focus Area	Participants are unable to agree on a focus area or have agreed on several unconnected foci.	The principal and the leadership team have agreed on a focus area, but other members of the school community have not committed to the focus area.	The principal, leadership team, and a substantial part of the school community have agreed upon a focus area.	All or most of the school community has agreed upon a focus area.
Needs Assessment Data	No needs assessment data have been gathered, or no data analysis has occurred.	Some needs assessment data have been gathered, but either the data or the data analysis is insufficient.	Adequate but not extensive data have been gathered, and data analysis has been adequate.	Data gathering has been varied and extensive, and data analysis has been extensive and deep.
Planning	No written objectives, action plan, or evaluation plan is in evidence.	Written objectives are in evidence, but no written action plan or written evaluation plan is in evidence.	Written objectives and a written action plan are in evidence, but no written evaluation plan is in evidence.	Written objectives, a written action plan, and a written evaluation plan are in evidence.
Implementation	No meaningful implementation has taken place.	Initial stages of the action plan are being/have been implemented.	Several components of the action plan are being/have been implemented.	Most or all components of the action plan are being/have been implemented.
Program Evaluation and Revision	No evaluation data have been gathered or data have not been analyzed.	Some evaluation data have been gathered, and some data analysis has taken place, but the evaluation process is not being used to improve the program.	Satisfactory data gathering and analysis have taken place, and the evaluation process is being used to some extent to improve the program.	Extensive data gathering and analysis have taken place, and the evaluation process is a major factor in continuous program improvement.
Collaboration	Little or no collaboration on the action research is taking place.	The principal and the remainder of leadership team are collaborating with each other, but the remainder of the faculty is not collaborating on the action research.	The principal, leadership team, and a substantial part of the school community are collaborating on the action research.	All or most of the school community is collaborating on the action research.
Effects	Little or no positive effects on school culture, teachers, or students.	Emerging positive effects on school culture, teachers, and/or students.	Moderately strong positive effects on school culture, teachers, and/or students.	Very strong positive effects on school culture, teachers, and/or students.

Getting Organized

The first step in the action research process is to select a focus area. Focus areas chosen by the schools included the following:

- Establish a balanced approach to literacy instruction across the content areas;
- Improve student attendance and academic progress;
- Improve reading comprehension;
- Improve balanced literature instruction in all grade levels through the use of peer coaching;
- Improve communication and collegiality among all members of the school community (parents, students, staff, administration, and community);
- Improve reading comprehension, particularly of nonfiction reading;
- Improve reading and writing skills in all content areas;
- Improve organizational culture and climate;
- Create an accelerated block schedule and create a new instructional program for repeating ninth graders.

The leadership team, including the principal, at one of the Starters identified the focus areas on its own, and the remaining five Starters gathered input from other members of the school community and invited the school community to participate in selecting the focus area. The Starters used a variety of strategies to choose their focus areas. These strategies varied from school to school, and included whole-school and small-group discussions, study groups, faculty surveys, nominal group technique, examination of student academic and student discipline data, and review of district initiatives and campus improvement plans. A teacher from a Starter described the process for encouraging participation in selecting a focus area:

We did that through grade-level meetings, working in vertical teams, starting to share concerns in small groups, then we would address the faculty as a whole, then break back down into small groups for clarification, and then back as a whole group...I think through our process the teachers have felt more of an ownership of where we're going and what we're doing...we felt that we really needed everyone on board.

In two of the Wheel Spinners, the principal chose the focus area, and in the third Wheel Spinner, the leadership team chose the focus area without input from the larger school community. Two of the three Wheel Spinners eventually chose a completely different focus area than their original one. The Wheel Spinners' reason for choosing the focus area in all three cases was student academic need, as indicated by student performance data. The composite Focus Area profiles, based on the means of participant ratings on the School-wide Action Research Rubric, and displayed on the Action Research Profiles, show the Starters at level 3.6 and the Wheel Spinners at Level 3.1. (See Figure 2.)

One of the most difficult aspects of action research was for schools to organize to initiate the action research process. Teachers at both Starters and Wheel Spinners reported that, initially, they were unclear on what was expected of them as participants in action research. Many participants reported feeling overwhelmed in the early stages of action research. All of the schools reported difficulty finding time to work on action research. Starters reported that after considerable struggle, they eventually began to move forward. One problem Wheel Spinners reported was the inability to resolve competing priorities

between their focus area and other school needs. A critical friend for a Wheel Spinner described this problem:

The group (leadership team) itself wasn't exactly positive where they should go. My impression was that the school had a number of initiatives going on at one time, and they were having trouble keeping their attention on what was supposed to be happening.

Another problem for Wheel Spinners was a tendency to abandon initial ideas for action research and return to the beginning stages of planning:

We have an overall goal. It's just that there were so many things that we didn't anticipate that we had to back up - way back - and start almost at ground zero in some areas.

Wheel Spinners also reported that they were hindered by a lack of resources needed to address their focus area.

The schools were asked what strategies they used in their attempts to organize for action research. The strategies varied from school to school, but included review of student performance data, whole-school discussions, professional development days, small-group brainstorming sessions, and assistance from university professors and graduate students. Some strategies used by Starters but not Wheel Spinners were surveys, establishing standing committees on different aspects of the focus area, intensive assistance from their critical friend, and teacher study groups.

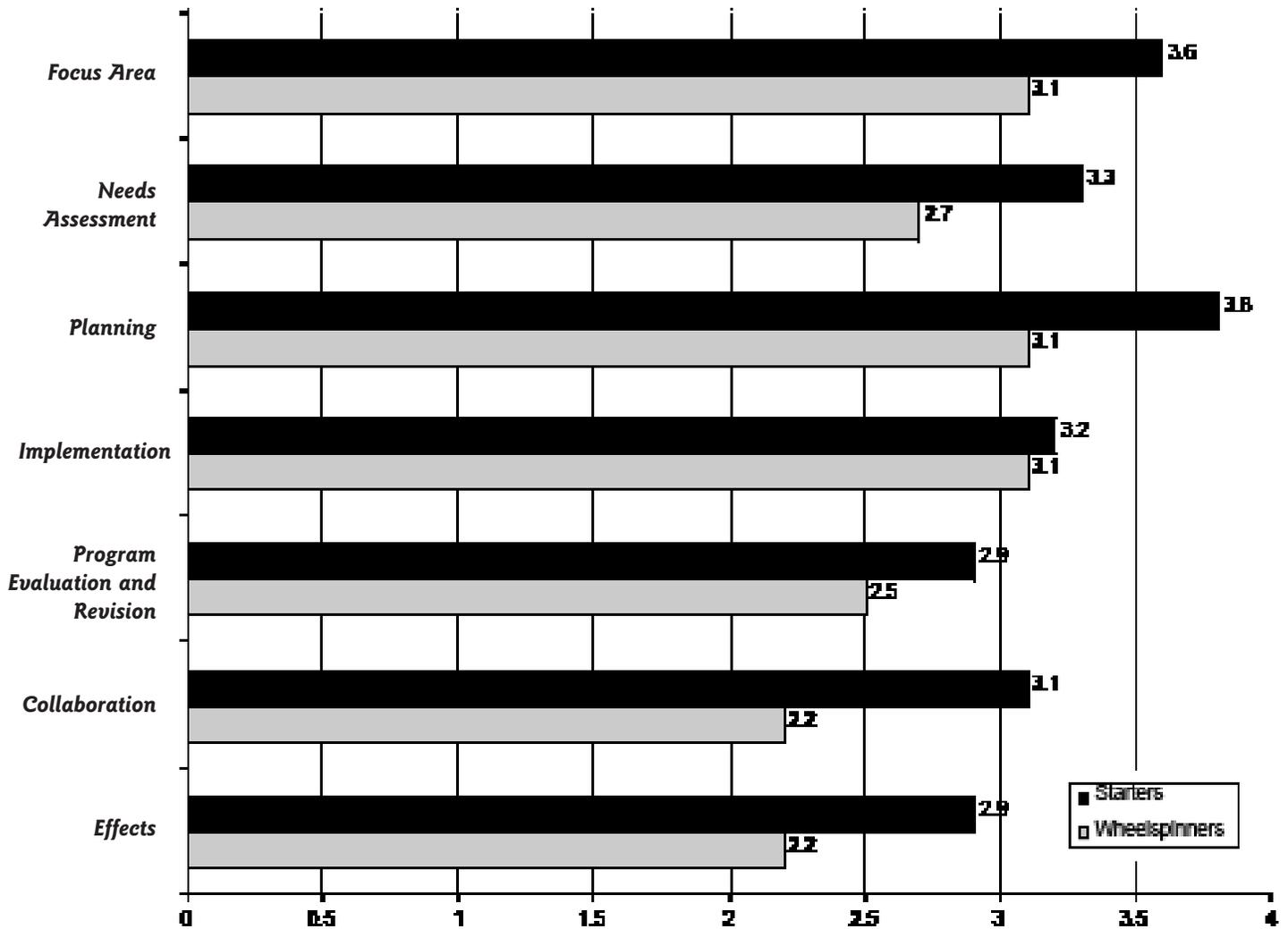
We asked participants if any breakthrough experiences or events helped them to become organized for action research. Five of the six Starters and one of the three Wheel Spinners reported breakthroughs, and several schools reported breakthroughs during different stages of start-up. There were no common breakthroughs, but examples include the following:

- Participation in an online research network
- Attending a particular Network workshop
- Finally finding adequate time to work on action research
- Assistance from university graduate students
- Meetings with parents
- The acquisition of needed materials
- The realization by teachers that action research is developmental
- A series of faculty discussions
- A meeting with the critical friend
- A combination of grade-level, vertical, and whole-school meetings
- Reflecting on readings provided by the principal

Gathering and Analyzing Data

Once schools selected a focus area and had organized for action research, they were encouraged to gather additional data on their focus areas before designing action plans. After schools had designed their action plans, they were asked to continue to gather and analyze data for the purpose of assessing progress and, when necessary, revising their action plans. Typical types of data gathered included student achievement, attendance, and discipline data; student, teacher, and parent surveys; and administrator and teacher behaviors. The type of data most frequently gathered was student achievement data, followed by teacher surveys, student surveys, and parent surveys. Graduate students at the university developed surveys and analyzed data for some schools. A school administrator expressed appreciation for such assistance:

Figure 2
Action Research Composite Profiles: Mean Ratings of Starters and Wheel Spinners



We were having difficulty finding the time to develop the surveys, and analyzing the data was going to be a big problem. So the fact that we got help from the graduate students alleviated that problem.

The difference between Starters and Wheel Spinners had more to do with the variety of data than the specific types of data gathered. Starters tended to gather a wider variety of data than Wheel Spinners. Two elements in the Action Research Profile that relate to data gathering and analysis are “Needs Assessment ” and “Program Evaluation and Revisions.” In the composite profiles for Needs Assessment, Starters were at level 3.6 and Wheel Spinners at level 3.1; and in the profile for Program Evaluation and Revisions, Starters were at level 2.9, and Wheel Spinners at 2.5. (See Figure 2.) The relevant section of the survey for data gathering and analysis was Inquiry. (See Table 1.) On each of the three items in this section, Starters had higher means than Wheel Spinners although the differences were not statistically significant.

Action Planning

In the early stages of their action research, some schools engaged in oral planning of improvement activities but did not develop written action plans. According to a teacher at one of these schools:

We saw the problem and we wanted to solve it. So after we got the baseline data we just started doing (improvement) activities and there was no plan.

Schools that jumped into improvement activities without action plans eventually regretted doing so. A teacher discussed this regret:

We don't have a visual plan. I mean, we're doing a lot of work, we're doing a lot of dialogue, but it's all oral, and it's not getting down on paper. I think we need help getting it down on paper so that when people come in and visit we can say, “This is our plan. This is how we're attacking it.”

Although some schools took longer than others to develop written action plans, eventually all nine schools submitted viable plans. In the composite profiles for Planning, Starters were at level 3.8 and Wheel Spinners at level 3.1. Across the five survey items on Planning,

Table 1
National Center for School Improvement (NCSI) Survey Responses by Question

Starters (n = 36) Wheel Spinners (n = 13)

	Content	Mean	Mean	Statistical Significance
	Collaboration			
1	Admin. and Leadership Team	4.61	4.69	0.7795
2	Teachers outside of Leadership Team	4.16	3.00	0.0000**
3	Substantial number of teachers	4.22	2.53	0.0000**
4	All or most teachers	3.83	2.15	0.0000**
5	Action research has increased	4.36	3.39	0.0002**
	Inquiry			
6	Data-based action plan	4.50	4.23	0.3132
7	Assess progress with data	4.39	4.00	0.2020
8	Data made action research successful	4.36	4.01	0.3854
	Planning			
9	Clear objectives	4.44	4.15	0.3005
10	Appropriate planned activities	4.42	4.39	0.9016
11	Appropriate evaluation plan	4.17	4.08	0.7380
12	Process allows for revision	4.50	4.31	0.4075
	Implementation			
13	As planned	4.44	3.62	0.0012**
14	School members participate	4.25	3.92	0.1612
15	Made goal for end of year	4.11	3.54	0.0699
	Assistance from NCSI			
16	Workshops valuable	4.33	4.23	0.7271
17	Utilized critical friend	4.19	3.15	0.0170*
18	Critical friend provided assistance	4.32	3.39	0.0168*
	Effects			
19	School's capacity to improve increased	4.23	4.08	0.5847
20	Professional growth of teachers	4.28	3.42	0.0009**
21	School culture improved	4.08	3.54	0.0535
22	Teaching and learning improved	4.08	3.67	0.0994
23	Making adequate progress on objectives	4.22	3.92	0.1829

* p <0.05 ** p <0.01

Starters had slightly higher means than Wheel Spinners, but none of the differences was statistically significant.

Implementing Action Research

Participants reported major differences between Starters and Wheel Spinners on implementation of action plans. All of the Starters reported moderate to extensive implementation, and all of the Wheel Spinners reported minimal implementation.

Activities completed by the schools as part of the implementation process include the following:

- Developed integrated curriculum
- Compared direct teaching to computer instruction
- Held school celebrations
- Placed students in special programs
- Implemented strategies for improved communication
- Hired additional teachers for new program
- Moved to a block schedule
- Worked to improve student attendance
- Attended training programs

- Developed a peer coaching program
- Initiated a new science program
- Organized study groups
- Presented demonstration lessons
- Provided mini workshops
- Organized classroom visits
- Arranged parent evenings
- Participated in faculty dialogue

The composite profiles for Implementation showed Starters at 3.2 and Wheel Spinners at level 3.1; however, responses to survey item 13 in Table 1, "So far, we are implementing the action research as planned," indicated a statistically significant difference between Starters and Wheel Spinners at the .01 level. Other survey items on implementation showed higher means for Starters, but these differences were not statistically significant.

The biggest barrier to implementation reported by both Starters and Wheel Spinners was insufficient time. This barrier was related closely to the barrier of competing needs. Wheel Spinners were not able to get past their perception that the time and energy needed to meet immediate needs prevented them from spending time and energy on long-term school improvement. The following was shared by a teacher from a Wheel Spinner:

I guess, seeing this (action research) is more of a long-term process. The priority goes to the short term and what has to be turned in tomorrow and the next week. Just the demands of the school itself have been a struggle...there are a lot of things that the administration does not want to ask of teachers because they already have three preps and a new type of schedule...And I think there was a feeling of, "you can't ask teachers to do anything else. There is not a single new thing that we can ask them to do and be fair and just." And so it's kind of stalled things.

Compare the above rationale to the report by the critical friend of a Starter on that school's effort to give teachers "the gift of time" for action research:

The main issue that kept coming up from the teachers was time, time, time. But part of what the school tries to give the teachers is the gift of time, trying to find creative ways to build in time for planning and collaboration. Also to provide substitutes, but not take away from productivity by providing too many subs. Also to have the teachers generate some creative ways to use existing time.

For Wheel Spinners, time and immediate needs were barriers that blocked action research. For Starters, time and immediate needs were barriers that were creatively addressed so that the action research could continue.

Collaborating

Two types of increased collaboration reported by teachers from both types of schools were collaboration within the leadership team (including principal-teacher and teacher-teacher collaboration) and collaboration between teachers on the leadership team and other teachers in the school. In addition to these types of collaboration, Starters reported increased collaboration between administrators and teachers *outside* the leadership team, increased collaboration *within* teams other than the leadership team. e.g., grade level teams, study groups, and increased collaboration throughout the school. A teacher serving on a leadership team talked about how collaboration on the

school's focus area of improved literacy had increased throughout the school:

I think there is a lot of collaborating going on at different levels, from the technology committee talking about different things affecting literacy to my own grade level's discussions, to teachers in the building at different grade levels. What was critical to us as a (leadership) team was to reach a comfort level for a critical mass of our teachers.

For Starters, improved communication and increased collegiality came hand-in-hand with increased collaboration. A teacher commented on the improved communication at her school:

I think more of us are looking for solutions and more of us are thinking, "OK, we really all have the same goal even if we don't have the same idea of how to get there." And I think we're willing to listen to each other, and more people are feeling listened to.

A different teacher discussed the increased collegiality that accompanied increased collaboration:

What I appreciate about our principal and critical friend is that when we meet as a group it's almost like the leadership role is gone. We're all equal group members, and that I truly appreciate because it makes me feel like, "OK, I have a purpose on this team and it's equal to everyone else's purpose on the team."

Another teacher summed up the interaction of collaboration, communication, and collegiality at her school:

We've had opportunities for whole-faculty discussions, grade-level discussions, and vertical discussion. The administrator sat on a vertical team as a member of the group, not as a leader. And that was important...they're not in charge...we're all in charge. Everyone has a stake in it.

Only one of the Wheel Spinners reported increased collaboration between the principal and teachers outside of the leadership team, and there were no reports from Wheel Spinners of increased collaboration within teams outside of the leadership team. In the composite profiles for Collaboration, Starters were at level 3.1 and Wheel Spinners were at level 2.2. Survey responses on items #1 through #5 concerning collaboration showed statistically significant differences at the .01 levels for four of the five items.

Assessing Network Assistance

General perceptions voiced by participants were that the workshops conducted by the Network were valuable because they provided important information, time for leadership teams to work on action research, and networking with other schools. Participants reported that, beyond time for collaborative work (always built into Network meetings), Network membership also gave the leadership teams time to build internal relationships. A teacher on one of the leadership teams stated:

We car pool to the meetings together, and we have our breaks together, and we eat lunch together, so it gives us a chance to build a relationship.

Participants reported that Network meetings also fostered relationship building and support among leadership teams from different schools. A teacher noted:

Providing time for discussion with other schools is helpful. We're not on our own in this. Someone else is doing it with us.

Other perceptions of Network assistance were scattered, with one to three schools reporting the following types of assistance:

- Helped leadership team see the big picture of school improvement
- Helped schools organize for action research
- Rejuvenated leadership teams
- Provided new ideas
- Helped schools focus their school improvement efforts
- Provided resources to assist action research
- Kept school improvement “on the burner”
- Provided leadership
- Provided an “umbrella” for school improvement initiatives

An interesting benefit listed above is that membership in the Network helped leadership teams see “the big picture” of school improvement. One teacher described this perception as follows:

It’s very helpful for us to get away from campus...to see what other schools are doing and hear about their struggles, but also to sit down and process...we are able to back up and see the forest; see the big picture of what’s going on in our building.

Many of the same participants who reported that Network membership helped them see the big picture of school improvement also reported that belonging to the Network helped them to stay focused on their action research project. A critical friend expressed this benefit:

It’s really streamlined our direction...Helped us understand, “What’s the next step?” I remember there was a meeting where we had to say, “What are some data gathering methods you’re going to use? What’s your timeline? Who’s responsible for things?” So those things are forcing us... I mean forcing in a good way...to think, and look at actions we need to take...It’s not a negative, hand slapping pressure. It’s sort of, “Hey, we want to see those charts!” Versus, if you are completely self-directed, its easy to get pulled in so many directions and just get sucked into the day-to-day campus activities.

Starters reported that critical friends were a tremendous source of assistance throughout the action research process. A sample of comments on critical friends, shared by participants from different schools, follows:

She’s been our guide...kind of a mentor bringing us through. Everybody feels comfortable with her. She has sat through our faculty meetings, given input, and said, “I’m here to support you in any way possible.” She has been an incredible resource. She’s done something very similar with her school as a principal prior to her work at the University... she has given us so many resources.

Graduate classes from the University reviewed literature, gathered data, and analyzed data for several of the Network schools. Starters were grateful for such assistance as indicated by a teacher reflecting on a survey that graduate students had designed and administered for her school:

They took a whole lot of weight off of us. We didn’t have to generate a survey. They even come out to the campus to give the survey and explain it. It was so much less work for us. It was very, very helpful.

Participants were asked to suggest ways that the Network could improve its assistance to participating schools. No themes emerged in the responses to this question, but scattered suggestions included making more of the following available: Network meetings; time at meetings for teamwork; leadership training; assistance developing data gathering instruments; assistance analyzing data; opportunities for networking; and workshop structure. On survey items concerning Network assistance, both Starters and Wheel Spinners agreed that the Network workshops provided valuable assistance to the action research process. On questions regarding assistance from critical friends, however, there were statistically significant differences between Starters and Wheel Spinners at the .05 level, with Starters reporting more utilization of critical friends and more valuable assistance from critical friends.

All six critical friends for the Starters reported that their work with the assigned school had been a positive experience and a valuable learning opportunity. One critical friend described how the role had expanded her own knowledge of action research:

I’ve done action research as a classroom teacher. I’ve taught about action research and had my graduate students do it in the classroom...But campus wide (action research) I’ve never attempted to do, so it’s been interesting to me and it’s been a learning experience for me.

Another critical friend discussed how her work with a Network School helped her meet her commitment to do field-based work with K-12 practitioners:

It’s been good for me because I got into schools, which I think is important...I have a personal view that, as (university) faculty members, we have a responsibility to get in there and get our hands dirty in the work. Not just come in and do research and tell people how to do it, but actually grapple with it. And so, for me, it’s been affirming, and I think this is the way to develop a relationship with (K-12) faculty.

Two of the three critical friends for the Wheel Spinners reported that being a critical friend had been a negative experience, fraught with frustration, and the remaining Wheel Spinner’s critical friend was ambivalent regarding the experience. A critical friend who failed to gain regular access to the school he was assigned to expressed his frustration with the experience:

I was very frustrated being unable to make a connection and to get into the (action research) process...I was told I would be contacted, or email would be forwarded, or I would know when meetings were happening, and nothing would happen for weeks and weeks. Finally I tracked somebody down and we met and they said, “Oh, we forgot to put your name on the list,” that sort of thing. In terms of my role there (at the school), frustration was about it.

Providing Leadership

When asked to identify those who provided leadership for their schools’ action research, respondents most often mentioned teachers on the leadership team, principals, and a “collective leadership.” Three of the six Starters identified their critical friends as providing leadership. Two of the three Wheel Spinners reported that their principal had dominated the decision-making process.

Starters and Wheel Spinners who reported their principals as providing strong leadership painted very different pictures of how

that leadership played out. Wheel Spinners were more dependent on their principals, and their principals tended to be more controlling. A teacher from a Wheel Spinner shared the following:

Janice (the principal) has everybody looking to her for leadership. And so we just all kind of stay in our classrooms and do our thing...and all of a sudden we got an email (from the principal) about this, and we're like, "OK, wait a minute. Is that the direction we really want to go?"

Starter teachers reporting their principals as strong leaders of action research described a supportive rather than a controlling leadership:

She's willing to learn, and she also is willing to back up (action research), like providing moneys for teachers to go to training...she will send teachers to the training or bring someone in to train us. It's a commitment on her part..."This is what we want to do with this building." And without that, the teachers couldn't do it. We need the leadership...we need the support.

Starter teachers, even from schools where principals provided strong leadership, reported that action research helped to move the school toward collective leadership:

Now it's not the principal; it's not the assistant principal. It's just us, working together. I think we can share and they can share. (It's) kind of like an even playing field.

A principal from a Starter expressed the same perception:

[Action research] really empowered all of us to be leaders on this campus. Our project is letting teachers be leaders...so, you know, when you talk about leadership, there are many different levels.

Describing Effects of Action Research

When interviews were held during the second semester of the start-up year, participants generally agreed that it was too early to expect or measure changes in student achievement as a result of their action research. Participants did describe a number of student assessment methods they were using or planning to use to measure student achievement in relationship to their action research. All six Starters reported that action research had resulted in improved collaboration and collegiality among members of the school community. One teacher from a Starter shared her belief :

One of the overriding themes, I'd say, would be respect. Respect from staff to staff, staff to student, and student to student.

A teacher from another Starter reported:

I'm talking to people now that I have never talked to before.

Starters also reported more risk-taking and experimentation among teachers. One critical friend described this effect:

Teachers seem to have been taking a lot of risks. You know, raise your hand and make a suggestion that's kind of out of the box; or they'll be really honest and candid about what's not working. And I think that really shows that there is trust developing...They just are able to say, "Hey, why are we doing this with students? This doesn't seem to be working." And someone else will chime in, "I agree." But it's not a negative gripe session. It seems more solutions-based.

Another critical friend talked about teachers becoming more willing to move out of their "comfort zone":

What's starting to emerge is people being willing to make their teaching a little bit more public...We talked about breaking into study groups, and there were still some teachers who wanted to get with their grade-level team and study the same things...but there are other teachers who have stepped forward and said, "You know, that's really not what's going to help us most. We need to step out of our comfort zone and be willing to work with other folks to make our teaching more public."

Other perceived positive effects varied widely from school to school. Varied effects reported by participants are listed in the Textbox.

Textbox

Varied Effects Reported by Network Schools

- Improved collaboration and collegiality
- Increased sense of community
- Involvement and synergy of teachers
- Teachers "stretching" more
- Increase in honesty and trust
- Teachers feel more appreciated and valued
- Students feel cared about
- Improved student discipline and safety
- Improved student attendance
- Restructured schedules
- Physical improvements
- Increased student productivity
- School is more student-centered
- Improved school culture and climate
- Increased teacher risk taking
- Increased principal visibility
- Teacher excitement about action research
- Peer coaching and feedback
- Increased teacher dialogue
- Improved curriculum
- Tutorials
- Integrated technology
- Integrated school improvement initiatives
- Improvement of benchmark test scores
- Improved teaching
- Curriculum articulation
- Unity of purpose
- Teacher use of problem solving process
- Increased teacher reflection
- Increased use of guided reading
- Pull-out program to meet students' individual needs
- Changed classroom practice

Wheel Spinners reported far fewer positive effects than Starters. Due to a Wheel Spinner's lack of progress, one of its teachers questioned whether the school should continue to be part of the Network:

We're not even sure we're meeting the minimum requirements of being associated in this...We're at this point where we can't move any further, so, you know there's a feeling of guilt...The whole issue of being part of this...are we doing it justice? Because we don't feel we are. And I think we're

certainly questioning whether it's worthwhile for us to even be involved, because we don't feel we're really on the road to anything.

The Action Research Profile on Effects shows Starters at level 2.9 and Wheel Spinners at level 2.2. Responses to survey items on Effects indicate that both groups of participants perceived that action research had increased their school's capacity to improve, a promising sign for Wheel Spinners. However, Starters were statistically significantly more likely than Wheel Spinners to report that teachers experienced professional growth as a result of the action research. Starters showed higher means than Wheel Spinners on improvement of school culture, improvement of teaching and learning, and making adequate progress toward meeting action research objectives, but the differences in these means were not statistically significant.

Discussion

The first year of something new is a learning experience in itself. In starting up a process of developing collaborative schoolwide action research in self-nominated schools, the School Improvement Network opened the door to learning about: (a) working collaboratively; (b) using data to solve a school-based problem; (c) designing and putting into action an implementation plan; (d) involving the whole school in working with the plan if not the process; and (e) doing all this with a conceptual roadmap that exists on paper but not in experience. Each step was the first step toward the end of the process, and each step was learned as it was taken. Given this reality, it is not surprising to see some of the data presented here.

In terms of major aspects of action research, the differences between Starters and Wheel Spinners involved each group's ability to take the ball and run with it. Starters were more able to work collaboratively, involve the whole school, utilize external resources, and begin to see effects. Wheel Spinners had difficulty working collaboratively or had difficulty developing leadership within a collaborative framework. They were less able to define a problem and develop a plan, even changing problems and plans midstream, which led to few effects. In one case, a Wheel Spinner's leadership team considered leaving the Network because they were uncertain of their ability to resolve collaborative and focus issues.

The data from interviews indicated that the schools initially were unclear about what was expected of them. They did not know how to engage with the action research process even though a step-by-step process was presented to them at the onset. They did not have the experience within which to place the process. Both groups also had difficulty with the issue of collaboration and leadership, especially with the principal as a collaborative member of the group. Within the process, each team member, including the principal, had a role to play in deciding what to do and how to do it. In many ways, the principals became outside resources as well as team members in that they were able to administratively "make happen" what the group decided. In two of the Wheel Spinners, the principal was unable to step outside the administrative hierarchy, or the team was unable to claim their authority within the context of the action research task. A teacher from one Wheel Spinner said of that school's principal, "She has good ideas, better than ours."

As discussed in both Allen and Calhoun¹¹ and Peters,¹² the issue of finding time for teamwork, planning, and reflection was present in all schools, even with the set-aside work time at the university workshops. Once teams returned to their schools, everyday life engulfed

them, and the structure of the workplace had to be adjusted to provide time. Another issue mentioned by teams in this study that has parallels in the previously mentioned studies was whether the action of the leadership team involved the whole school and was recognized by the whole school, or whether the team existed autonomously as a small group without the recognition, support, and resources of the entire school community. Only Starters' leadership teams (and not all of them to the same degree) talked about their ability to be a part of a whole-school effort. Wheel Spinners' leadership teams saw themselves mostly as an autonomous group.

If working collaboratively as a team and as a part of a school-wide effort presented challenges, the issue of the culture of schools and the normative relationships and responsibility of parties within a school also came to the forefront in both the interviews and the quantitative data. Starters did better than Wheel Spinners in working within the culture, adapting structures as needed by the team or the plan. Wheel Spinners and their leaders had more difficulty overcoming normative relationships and structures. They saw themselves as limited in various ways, either by the principal or by other issues in the school context.

In a similar vein, Starters did better than Wheel Spinners in their organization of effort and diversity of data collection strategies. Starters used a larger variety of ways to collect data, from reviewing archival data to conducting focus groups. They also were better at finding the resources they needed and in utilizing the resources that were available. Starters worked better with their critical friends, utilized graduate students to help with aspects of their projects, and asked the university and outside sources for assistance when they saw the need for. In fact, Starters said that breakthroughs in finding time, resources, or assistance meant sudden movement forward in ways that they did not always anticipate. Working the system, being creative, and reaching out helped put plans in action, or helped solve problems related to putting them in action. In contrast, Wheel Spinners did not utilize potential assistance, and in two of the sites, actively resisted contact by critical friends, perhaps due to structural norms and issues at the schools.

Planning and implementation also proved a challenge to all schools. Many of the schools had never developed a plan geared to implementation despite their work on school improvement plans. Action plans took a long time to develop and formalize, and many would have never reached the formal state without friendly pressure from critical friends and the university facilitators. At one university-school workshop, for example, an afternoon was devoted to presenting information about implementation strategies and talking to individual groups about how to go about putting their plans in place.

Despite all of their struggles, both groups perceived that action research had increased their school's capacity to improve. They also felt they had benefited from the university-sponsored workshops and had learned something about using data, planning, and implementing plans. They still had concerns about what leadership might look like for this kind of process and requested more training on leadership skills and more ideas about how to be leaders in their schools. By the end of the year, all groups were ready to move forward to year two with what they had experienced in year one, regardless of effect or outcome. For Wheel Spinners, the outcome in some cases was resolving their team, leadership, and context issues and declaring themselves an action research team ready to start again.

Conclusion

This study provides a good example of change being a learning experience as much as an outcome. It suggests that becoming an action research team is as much an innovation as the changes the team selects to put in place through the process. As such, it also suggests that training in the “how” of being an action research team, including how to be leaders, how to implement, and how to utilize resources, is as important as the “what” of action research. Calhoun¹³ and Allen and Calhoun¹⁴ emphasized the need for ongoing professional development as part of schoolwide action research. While universities may do professional development on what the action research process is, they seldom attend directly to the need for professional development as an integral part of the action research process itself. Practice makes perfect; and as these teams continue to practice and resolve these issues, their schools will change as well, not only for the sake of specific improvement goals, but also in terms of the school culture and work environment.

Endnotes

¹ Author's Note: This study was sponsored by the National Center for School Improvement (NCSI) at Texas State University–San Marcos. NCSI is funded in part by grants from the United States Department of Education and Washington Mutual.

² Nigel Bennet and Alma Harris, *Hearing Truth from Power? Organization Theory, School Effectiveness and School Improvement*, a paper presented at the Annual Meeting of the American Educational Research Association, Chicago, Illinois, March 1997.

³ Alma Harris, *School Improvement: What's in it for Schools?* (New York: Routledge Falmer, 2002); Frances O. Rust and Helen Friedus, Ed. *Guiding School Change: The Role and Work of Change Agents* (New York: Teachers College Press, 2001).

⁴ David Hopkins, Mel Ainscow, and Mel West, *School Improvement in an Era of Change* (New York: Teachers College Press, 1994); Bruce Joyce, Emily Calhoun and David Hopkins, *The New Structure of School Improvement: Inquiring Schools and Achieving Students* (Philadelphia: Open University Press, 1999); Susan J. Rosenholtz, *Teacher's Workplace: The Social Organization of Schools* (New York: Longman, 1989); Charles Teddlie and Sam Stringfield, *Schools Made a Difference: Lessons learned from a 10-year Study of School Effects* (New York: Teachers College Press, 1993).

⁵ Emily F. Calhoun and Lew Allen, *Results of Schoolwide Action Research in the League of Professional Schools*, a paper presented at the Annual Meeting of the American Educational Research Association, New Orleans, Louisiana, April 1994; Carl D. Glickman, Stephen P. Gordon, and Jovita M. Ross-Gordon, *SuperVision and Instructional Leadership*, 6th ed. (Boston: Allyn & Bacon, 2004).

⁶ Emily F. Calhoun, “Action Research for School Improvement,” *Educational Leadership* 59 (March 2002): 18-24.

⁷ Lew Allen and Emily Calhoun, “Schoolwide Action Research: Findings from Six Years of Study,” *Phi Delta Kappan* 79 (May 1998): 706-710.

⁸ Lewin (1946), as quoted in Calhoun, 211.

⁹ Allen and Calhoun, “Schoolwide Action Research.”

¹⁰ Judy Peters, *Expecting Too Much from School/University Partnerships for School Improvement*, a paper presented at the Annual Conference of the British Educational Research Association, University of Exeter, England, September 2002, 11.

¹¹ Allen and Calhoun, “Schoolwide Action Research.”

¹² Peters, *Expecting Too Much*.

¹³ Calhoun, “Action Research for School Improvement.”

¹⁴ Allen and Calhoun, “Schoolwide Action Research.”

APPENDIX

National Center for School Improvement School Improvement Network

Spring 2004 Survey

Name of your School: _____

Check One: Campus Administrator Teacher Critical Friend

PART I: MULTIPLE CHOICE

For each item in Part I, use a number 2 pencil to blacken the oval on the answer sheet that corresponds to the single most nearly correct response to that item.

Possible responses to the items in Part I are:

- (A)** *Strongly disagree*
- (B)** *Disagree*
- (C)** *Not Sure*
- (D)** *Agree*
- (E)** *Strongly Agree*

Collaboration

1. The administration and leadership team (the team that attends NCSI meetings) are collaborating on the action research.
2. Teachers outside of the leadership team (the team that attends NCSI meetings) are collaborating on the action research.
3. A substantial number of teachers are collaborating on the action research.
4. All or most of the school's teachers are collaborating on the action research.
5. The action research has increased collaboration within the school community.

Inquiry

6. The action plan is data-based.
7. Data have been gathered to assess the progress of the action plan.
8. Data analysis has made the action research more successful than it would have been without data analysis.

Planning

9. Our action plan's objectives are clear.
10. Our planned activities are appropriate for reaching our objectives.
11. Our evaluation plan is appropriate for assessing the effects of our action research.
12. Our action research process allows us to revise our action plan as appropriate.

Implementation

13. So far, we are implementing the action research essentially as planned.
14. Members of the school community who were expected to participate in the action research are, in fact, participating.
15. As the year ends, we are where we want to be regarding implementation of the action research.

Partnership, Preparation, and Progress in Training Community College Administrative Leaders

Ramon Dominguez

In Spring 2002, the Department of Educational Management and Development at New Mexico State University implemented the Community College Leadership Doctoral Program (CCLDP). This program was designed as a distance education doctoral program consistent with the mission of the university as a land grant institution “providing access as well as fundamental research; and serving the people of the state of New Mexico.”¹ Initiated as a cohort inclusive of a diverse group of graduate students from throughout the state of New Mexico, the program provided seasoned community college administrators in rural communities an opportunity to earn a doctorate in educational administration. Three years later, approximately 60% of the fifty-two student cohort will have earned their doctorate, and it is expected that by the end of the Fall 2006 semester a total of 75% of the cohort will have completed their degrees.

The success of the program as measured by a high retention and graduation rate has provided New Mexico’s community colleges with a significant number of trained and credentialed administrators at a time when it is estimated by the American Association for Community Colleges that 45% of community college presidents plan to retire by 2007.² Having a sufficient number of qualified individuals to fill vacant positions is essential for community colleges in both New Mexico and the nation. Qualified individuals must be well-prepared both academically and “practically” to take a leadership role in a major institution of higher education, the community college. The purpose of this study was to determine whether the CCLDP was achieving these goals. Specifically, the researcher sought answers to the following questions: (1) Were graduates prepared to take on the significant role and responsibility of enhancing the present-day mission and future challenges of the modern comprehensive community college as well as enhancing the success of the “whole” student? and (2) How did the CCLDP and community colleges work in partnership to prepare students with a comprehensive theoretical administrative base as well as a strong practical perspective?

Forming Partnerships

Initiating and implementing the Community College Leadership Doctoral Program depended on collaboration between the university and New Mexico’s community colleges. The collaborative efforts

were dependent on the support of New Mexico State University’s President, Provost, Dean of the College of Education, the Educational Management and Development Department Head, and the chief executive officers of the community colleges. The collaborative efforts between CCLDP and the community colleges took a variety of forms. First, in order for a student to be admitted into the program, the sponsoring chief executive officer was asked to write a letter of support. Second, the president or executive vice-president of the community college was approached by EMD faculty with a request to utilize their college’s physical facilities, telecommunications equipment, and interactive television studio. Third, the community college allowed EMD faculty to meet with prospective students to review the structure and requirements of the program. As Buettner, Morrison, and Wasicek have noted: “The strongest partnerships are those in which there is considerable perceived benefit by each of the partners. Each partner perceives the greatest value to the extent that its special needs and wants can be accommodated.”³

Program Structure

Based upon a statewide assessment of community college personnel and the university’s strategic plan to increase distance education initiatives, the CCLDP was designed as a three-year program. Students enrolled in six to nine credit hours during the fall, spring and summer for two years and met five weekends (Friday/Saturday) during each semester to complete their coursework. Since students represented rural communities across the state, the class sessions were conducted through a hybrid of distance media with interactive television as the primary medium connecting six sites simultaneously. These sites included Albuquerque, Clovis, Hobbs, Carlsbad, Farmington, and the originating site of Las Cruces. Secondary media of WebCT and limited face-to-face sessions supplemented the teleconferencing instruction.

Curriculum

The program structure was complemented by the curriculum which combined an academic research-based perspective with the practical aspects of community college administration. Peel, Wallace, Buckner, Wrenn, and Evans have noted: “Research suggests that the most successful educational leadership preparation programs are those that integrate theory and practice to provide students with a more realistic perception of the field.”⁴ In addition, according to Duvall: “Community college leadership programs recognize that learning is best done in a social community, not just solitary inquiry, and that new learning and being with other new learners lead to new information to making new meaning of existing information.”⁵

The practical component included courses relevant to the daily administration of the organization, which included community college administration, law, finance, politics, public relations, student services, leadership, and the internship. The instructional strategy focused on providing students “real life” approaches to situations, issues, and challenges faced in community college environments. For example, the law course presented students with issues involving faculty contracts, academic freedom, due process, and faculty/student relations. The leadership course encouraged students to compare their leadership style to research-based approaches and provided them the opportunity to interact with their staff or colleagues in “testing” their style. By identifying and comparing their leadership styles, students could conduct an introspective analysis of their

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“behavioral approaches” to situations. The challenge of understanding themselves in order to understand others and providing pro-active leadership rather than reactionary leadership were essential components of the leadership course. The “behavioral assessment” was accomplished through case study presentations, inventories, group discussions, individual reflection papers, and observations.

One of the most important practical initiatives in the program was the internship experience which involved a training partnership with the community college. According to Duvall, “Structured internships recognize the practitioner component of community college leadership training.”⁶ The majority of students were placed in an internship at their own community college to continue experiencing their own environment but in a different division or department. Aside from obtaining different perspectives and observations, students not only contributed to their assigned division/department but also assisted the institution by positively impacting students at the respective community college.

The internship experiences varied in scope and assignment and included the following: (1) observing and comparing leadership styles involving senior management, planning/evaluating instructional programs/courses; (2) developing/evaluating distance learning programs/projects; (3) conducting campus-wide assessment for regional accreditation; (4) developing leadership institutes for students; (5) creating multiethnic community partnerships; (6) monitoring enrollment trends; (7) assessing student services; (8) establishing partnerships; (9) analyzing financial reporting requirements; (10) conducting feasibility studies; and (11) investigating/researching funding sources.

A description of two internship experiences highlights the partnership between the CCLDP and community colleges to train administrative leaders in real world scenarios. For example, one internship involved a community college partnering with the community’s municipal court to provide avenues of alternative sentencing. The intern set forth to meet the following objectives: (a) establish a college/municipal court partnership to develop programs that would benefit offenders sentenced by the court; (b) design classes/workshops/short-term training that would serve as alternative options when sentencing offenders; and (c) explore grants or other funding sources to institute and maintain the program. Through observation in the courtroom and consultation with the municipal judge, an analysis of the courtroom procedure-sentencing format was established. Research into similar programs and factors contributing to the offenses provided a foundation for the development of action plans offenders could utilize to negotiate fulfilling of their sentence through workshops or classes at the community college. The internship provided for collaboration between a higher education entity and a government agency to address a dilemma by presenting a solution with societal and educational value.

A second example involved an internship examining a collaborative effort between a political organizing group and a community college in the development of a job training program. Through interviews, research, and consultations with the community college and political group, the intern pursued the following actions: (a) analyzed methods by which community training needs were identified; (b) examined the benefits gained through community and college job-training collaboratives; and (c) explored strategies for creating change and building social capital. This internship allowed the student to integrate the partnership concept with much needed job-training efforts

that will benefit the community. Russell and Flynn note that collaborations which include “outreach, service learning, interprofessional preparation, and strategic alliances... are of benefit to the college, school, or department’s students and constituents.”⁷

The practical components of the CCLDP were complemented by research-based courses including evaluation design, elements of research, Edumetrics,⁸ independent research, organization and planning, dissertation seminar, and dissertation. The instructional strategy focused on providing a strong research foundation supplemented by addressing daily administrative challenges. For example, the elements of research course presented students with an overview and applications of quantitative and qualitative methods. Utilizing these methods, students undertook research projects relevant to issues facing their local community colleges and applied their findings to state or national community college environments.

Through the independent research course, students explored a variety of issues impacting community colleges. Their exploratory review led them to consider a number of topics, such as: (1) common characteristics of leadership in multiethnic community partnerships; (2) use of distance education by faculty; (3) faculty and student retention; (4) relationships between cultural values and learning styles in post-secondary educational settings; (5) diversity in the classroom; (6) impact of Hispanic Serving Institutions; (7) functional partnerships between postsecondary institutions and high schools; (8) transformational leadership; (9) transfer within community college programs and from community colleges to universities; (10) economic impact of community colleges; (11) financial aid impact on non-traditional students; (12) communication behaviors of community college leaders; (13) academic dishonesty; (14) institutional image as perceived by stakeholders; (15) predictors of success in nursing programs; (16) external socioeconomic influences on student success; and (17) costs and benefits of program evaluation and assessment.

The dissertation seminar guided students through the complexity and dynamics of developing their dissertations. Emphasis was placed on format, mechanics, components, chapter contents, references, and literature reviews. The eventual goal of the course was the completion and defense of their dissertation proposal. The proposal encompassed the first three chapters of the dissertation and required the approval of a four-person doctoral committee. The completion of the final dissertation document was a major unification stage between research-based practices and reality-based scenarios. The CCLDP and the community colleges came together to assist students in successful completion of a comprehensive and relevant dissertation focusing on challenges confronting community colleges.

The development and defense of the dissertation were preceded by the oral comprehensive exams. In order to advance to candidacy, doctoral students were required to pass a three-day written examination followed by an oral defense. The oral comprehensive defense was conducted by a committee of four professors, with one of the committee members assigned by the graduate school dean to ensure fairness and adherence to university policies during the examination. This committee member was drawn from a department outside the Department of Educational Management and Development. Two committee members were required to be department professors. In keeping with the objective of working in partnership with the community colleges to train administrative leaders, the fourth committee member was selected from the ranks of senior level com-

community college administrators. The chief executive officer of each community college affiliated with the university through its CCLDP students was sent a letter of invitation to serve on a doctoral committee. In addition, the chief executive officer was given the discretion to nominate senior managers for service on committees. The criteria for doctoral committee membership was an earned doctorate and appointment to a senior level administrative position at or above the position of director.

Once the chief executive officer had nominated potential committee members, each nominee was contacted by CCLDP staff and requested to submit a vita. The submission of the vita was also a requirement for chief executives willing to serve. The vita was forwarded to the graduate school for review by a graduate faculty committee and a final qualification assessment by the graduate school dean. With the approval of the graduate school, the nominee was accepted as the community college representative on a doctoral committee. The newly appointed committee member received an approval letter as well as instructions and materials for serving on doctoral committees.

The community college representative was the link between the university research-based perspective and the practical world of the community college administrator. As part of the four-member committee, the representative worked with the student through three major programmatic phases: (a) presenting an oral comprehensive examination; (b) developing the dissertation proposal; and (c) defending the final dissertation. The committee, through the leadership of the committee chair (advisor), guided the student throughout the critical phases of the CCLDP. This collaborative effort was evident in the CCLDP dissertations completed. The work reflected scholarly approaches to real community college issues.

The following two dissertations serve as examples of the utilization of scholarly approaches to addressing community college issues.⁹ In the first, "Community College Transfer Rates: A Comparison of Survey Responses by Administrators, Faculty, Students, and Constituents at New Mexico Junior College to a National Sample," Bensing gathered survey data from administrators, students, faculty, and constituents regarding the importance of the transfer function at a New Mexico junior college located in southeastern New Mexico.¹⁰ The survey responses from these groups were then compared to responses from comparable groups from a national study. The Chi-square and Fisher Exact Probability Test were utilized to compare responses of high transfer rate and low transfer rate students. The inferential statistical analysis indicated that the responses of the New Mexico participants were statistically different from responses of the high transfer and low transfer groups in the national study. Specifically, New Mexico participants from both groups strongly believed that the transfer function was a major responsibility of the junior college with approximately 60% of students participating in the survey listing preparation for transfer as their primary reason for enrollment. This dissertation provided valuable information to upper management regarding the programmatic direction of the college.

While the first dissertation generated information essential to a specific community college, the second emphasized research applicable to community colleges in general. The purpose of Garcia's study was to identify those factors influencing community college faculty to include service learning in their courses.¹¹ Through a survey of approximately 200 hundred faculty representing 40 community colleges affiliated with the American Association of Community

Colleges, the study sought answers to four questions: (1) Who motivates faculty to include service learning in their courses? (2) What institutional support factors motivate faculty to include service learning in their classes? (3) What student learning outcomes motivate faculty to include service learning in their courses? and (4) What rewards motivate faculty to include service learning in their courses?

The study concluded that an institution's service learning coordinator had a major impact on faculty members' decisions to include a service-learning component in their courses. Secondly, the benefits students gained from the service learning experience outweighed compensation, course release time, praise, or recognition as faculty motivators. Thirdly, faculty were motivated by the increase in students' civic responsibility. This dissertation provided practical insights, supported by research, for community college administrators who want to encourage service learning.

Implications

The Community College Leadership Doctoral Program attempts to bridge theory and practice in the preparation of higher education leaders. The task is complex, especially when a substantial portion of instruction is delivered through distance education media. However, instructional delivery was facilitated by the collaborative efforts of the community colleges and New Mexico State University. The success of this collaboration reinforced the findings of Williams and Pennington: "Community colleges and universities today are more likely to look into institutional cooperation to meet a variety of contemporary challenges and problems."¹² Further, Buettner et al. shrewdly observed that "when a partnership emanates from an overlapping but noncompetitive mission, its potential and potential durability are greatest."¹³ By working together, these institutions of higher education contributed to producing motivated and skilled administrators who not only earned doctorates but contributed to their community colleges by participating in research and internship activities that benefited students and positively impacted the community.

¹ New Mexico State University, *Strategic Directions, Benchmarks and Performance Indicators 2001-2002*, <http://www.NMSU.edu/Research/iresearch/ind306.pdf>, 3.

² Martha Romero, "Who Will Lead our Community Colleges?" *Change* 36 (November-December, 2004), <http://firstreach.oclc.org/images/WSPL/wspdf/HTML/03036/P4DER/G59.HTM>.

³ David L. Buettner, Michael C. Morrison, and Margery Wasicek, "Successful Experiences with Making Partnering an Operational Strategy," *New Directions for Community Colleges* 2002 (Fall 2002): 5-12.

⁴ Henry A. Peel, Corinna Wallace, Kermit G. Buckner, Steven L. Wrenn, and Ralph Evans, "Improving Leadership Preparation through a School, University, and Professional Organization Partnership," *NASSP Bulletin* 82 (December 1998): 26-34.

⁵ Betty Duvall, "Role of Universities in Leadership Development," *New Directions for Community Colleges* 2003 (Fall 2003): 63-71.

⁶ Duvall, "Role of Universities in Leadership Development."

⁷ Jill F. Russell and Richard B. Flynn, "Commonalities Across Effective Collaboratives," *Peabody Journal of Education* 75 (Spring 2000): 196-204.

⁸ Edumetrics Institute, <http://www.edumetrics.org>.

⁹ See the Appendix for a listing of dissertations completed through the Community College Leadership Doctoral Program, 2004-2005.

¹⁰ Robert M. Bensing, "Community College Transfer Rates: A Comparison of Survey Responses by Administrators, Faculty, Students, and Constituents at New Mexico Junior College to a National Sample" (Ed.D. diss., New Mexico State University, 2004).

¹¹ Rudy Garcia, "Factors that Motivate Faculty to Include Service Learning in Their Courses" (Ed.D. diss., New Mexico State University, 2004).

¹² Mitchell R. Williams and Kevin Pennington, "Collaboration in Professional Development," *Planning for Higher Education* 31 (September/November 2002): 39-45.

¹³ Buettner et al., "Successful Experiences with Making Partnering an Operational Strategy."

Dissertations Completed by Students in the Community College Leadership Doctoral Program, 2004 and 2005

Abbott, Barbara Gayle. "The Impact of Community College Student Support Services: An Effective Parsimonious Model for Enhancing Student Persistence and Academic Achievement." Ed.D. diss. New Mexico State University, 2004.

Anderson, Deborah . "Vocational Advisory Committee Chair Leadership Practices: A Comparison of Chairs' and Members' Perception at Selected New Mexico Community Colleges." Ed.D. diss. New Mexico State University, 2004.

Bader, Jeff R. "Faculty Perceptions of Issues Affecting the Utilization of Distance Education Technology: The Case of New Mexico State University's College of Agriculture and Home Economics." Ed.D. diss. New Mexico State University, 2004.

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Bircher, Wendy Diane. "The Effect Of Cultural Influences on American Indian Students' Matriculation Into a Southwestern Community College." Ed.D. diss. New Mexico State University, 2004.

Brandon, Judy Scott. "A Qualitative Study for the Identification of Wives of Enlisted Military Personnel as At-Risk Students for the Development of a Campus Wide Support Model for Those Students." Ed.D. diss. New Mexico State University, 2004.

Brito-Asenap, Teresa. "Project QUEST and the Alamo Community College District: A Community Partnership in Job Training." Ed.D. diss. New Mexico State, 2005.

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Isham, Eleonore Kate. "Faculty and Administrators' Beliefs About Experience with, and Willingness to Utilize, Distance Education Technology in Medium-Sized New Mexico Community Colleges." Ed.D. diss. New Mexico State University, 2004.

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Martinez, Vidal. "Hispanic GED Students and Their Barriers to Learning in English Language ABE Programs in Northern New Mexico Community Colleges." Ed.D. diss. New Mexico State University, 2005.

Megert, Diann Ackerman. "High School Advanced Mathematics Classes: A Better Predictor than High School Grade Point Average for Choosing Community College Honor Scholarship Candidates." Ed.D. diss. New Mexico State University, 2004.

Neel, Linda L. "Financial Aid Students at Risk: The Federal Financial Aid Appeal Process and Student Persistence." Ed.D. diss. New Mexico State University, 2004.

Organ, Regina Griffin. "A Study of Career Satisfaction Among Community College Chief Executive Officers." Ed.D. diss. New Mexico State University, 2004.

Schmidt, Michelle Melinda. "An Examination of Variables Associated with Student Completion at Clovis Community College." Ed.D. diss. New Mexico State University, 2004.

Schoonmaker, Stephen. "Faculty Leadership in the Classroom: Using the Transperceptional Leadership Model to Study the Impact of Student Perception of Faculty Leadership on Instructor Effectiveness." Ed.D. diss. New Mexico State University, 2004.

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Cognitive Development of Adult Undergraduate Students: Cohort and Non-Cohort Settings

Royce Ann Collins

In response to the increased number of adults in the student population, colleges and universities began offering courses in a variety of formats to accommodate the working adult's schedule.¹ These formats include, but are not limited to, intensive weekend courses and accelerated cohort programs. While traditional students have been studied to ascertain how college affects them intellectually,² research is needed to address the impact of the college experience on the adult student.³ Magolda reported that "understanding college students' intellectual development is at the heart of effective educational practice."⁴

Over the years, college administrators and faculty have been looking at ways to understand how traditional college students develop and learn,⁵ and how adult students learn.⁶ Pascarella and Terenzini in their book, *How College Affects Students*, presented an overview of the major developmental theories and research.⁷ One aspect of college learning examined is the development of cognitive competencies--not just what is learned in the content areas, but the thinking skills developed as a result of being a participant in the college education process. Pascarella and Terenzini stated:

These cognitive competencies and skills represent the general intellectual outcomes of college that permit individuals to process and utilize new information; communicate effectively; reason objectively and draw objective conclusions from various types of data; evaluate new ideas and techniques efficiently; become more objective about beliefs, attitudes, and values; evaluate arguments and claims critically; and make reasonable decisions in the face of imperfect information.⁸

The question for college educators is: Do adult students in non-traditional formats develop cognitive complexity? This phenomenological study explored if and how adult undergraduate students increase cognitive complexity using Perry's scheme⁹ in two different educational delivery systems, an intensive non-cohort model and an accelerated cohort model.

Intellectual Development

As a result of his research on cognitive complexity, Perry stated that people organize meanings out of their experiences.¹⁰ Cognitive complexity is the ability to think in more complex ways moving from a dualistic, objective view to a multiplicity, subjective view, to a more

relativistic, constructivist perspective. Hofer and Pintrich maintained that this development is "...the evolution of individual's thinking structures and meaning-making toward greater and more adaptive complexity."¹¹ According to Moore, Perry's work "underscores the notion that the most powerful learning, the learning most faculty really want to see students achieve as a result of their college experiences, involves significant qualitative changes in the learners themselves."¹²

Perry first published his scheme in 1970 after completing a longitudinal study of college students 1954-1963.¹³ His study on the abstracts of knowing and valuing demonstrated the possibility of assessing developmental positions. Nine positions were developed from his extensive interviews of students whom he followed from their freshman year at college through their senior year. He chose the word *position* to stress the lack of a specified duration. The focus of each position is on the person's point of view at that time. To move from one position to another takes motivation to reorganize major personal investments. Each position includes and transcends the previous one and should be seen as development rather than change. The capitalizations seen in the following description of each position are a part of Perry's explanation. Since only the first 5 Positions deal with intellectual development, this study will examine only these positions.

Perry's Position 1, "Basic Duality", is a time when a person sees the world in polar terms: we-right-good vs. other-wrong-bad. The person holds the belief that "Right Answers" exist for everything in the "Absolute" and are known to "Authorities" whose responsibility is to teach them. During this period, there is no objectivity, and there is one right answer to all questions. The way to solve problems is through adherence, obedience, or conformity to the "Right" and what "They" want. A manifestation of this position is a student reading all assigned readings word by word. According to Perry, all individuals possess the cognitive complexity of Position 1. Transition from Position 1 to Position 2 often comes from a challenge from peers. Diversity experienced with peers and within the classroom causes students to question if differences of opinion can exist in the "Absolute".¹⁴

Position 2, "Multiplicity Pre-Legitimate", is a time when students are able to perceive diversity of opinion and uncertainty. However, they account for these as unnecessary confusion in poorly qualified "Authorities" or as mere hoops set by the "Authorities" in order for students to find the answer for themselves. The student usually aligns himself or herself in "Opposition to the Authority". There is still the overriding expectation that one answer must be right. Although the "Authority" and "Absolutes" are still assumed to be readily available, the student must seek them out. During this position of development, among the confusion there is some grappling with uncertainty and complexity, which assists students in moving to Position 3. Transition from Position 2 to Position 3 is prompted by students realizing that "Authorities" admittedly do not have all the right answers.

"Multiplicity Subordinate", Position 3, is a time when diversity and uncertainty are accepted as legitimate, but temporary, in that the right answer has just not been found yet. Uncertainty and complexity are not looked upon as just exercises imposed upon students, but as realities in their own right. Multiplicity gives the person permission to form his or her own opinion. Students during this stage seek out the parameters in which their opinion will be graded. Students may

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feel in conflict with the fact that there is a spread of uncertainty and diversity among “Authorities”; yet they will be assigned a grade under this uncertainty. Transition from Position 3 to Position 4 takes place when the tie between “Authority” and “Absolute” is loosened. During this transition, students realize that uncertainty is unavoidable. Students have not distinguished between legitimate abstract thought and “bull”. A student’s attitude toward “Authority” is crucial at this point. If a student is resentful of the “Authority” (Oppositional), then he or she may “Escape” or “Retreat”. “Escape” as defined by Perry is abandonment of responsibility or alienation.¹⁵ “Retreat” is to stay in the simplest form of dualism and avoid complexity and ambivalence. In contrast, students who trust in “Authorities” (Adherence) move forward, but along a different path.

In Position 4, “Multiplicity Correlates” or “Relativism Subordinate”, development splits into two groups based on the student’s tendency toward “Opposition” or “Adherence”.¹⁶ Both development sequences are considered equivalent. In “Multiplicity Correlates” (4a), the student takes the path of “Opposition”. The perception is that legitimate uncertainty is extensive. As long as there is ambiguity, the student has the right to his or her own opinion, and “They” will have no right to call it wrong. An opinion, however, is not related to evidence, experience, expert judgment, or purpose, but to the person who holds it. All that cannot be proven “Wrong” is “Right”. Thus, this structure is still dualistic. In “Relativism Subordinate” (4b), the “Adherence” students are more trusting and follow a much smoother path. The student assimilates, under the guidance of the “Authority”, that there is uncertainty, ambiguity, and differences of opinion in the world. The awareness that there is more than one approach to a problem causes the individual to start the process of metacognition, thinking about thinking. Answers are no longer viewed as right or wrong, but evaluated in terms of good or bad. In Perry’s study, Position 4 was where most of the freshmen students concluded their first year of college. Transition from Position 4a to Position 5 was very difficult for these students. Transition from Position 4b to Position 5 was a move from *what they want to the way they want us to think*. Reasoning provides the lever to move knowledge from dualistic to the qualitative. Some answers may be more legitimate than others. Theories move from truth to models or metaphors which approximate the order of observed data or experience.

During “Relativism Correlate, Competing, or Diffuse”, Position 5, the student perceives all knowledge and values as contextual and relativistic. During this position, students can “...spot a false dichotomy, talk about assumptions and frames of reference, and argue about the degree of coherence of interpretation or their congruence with data.”¹⁷ Relativism is perceived as the common characteristic of all thought and relationships. Students are quite taken with this new skill and use it in exploring alternative perspectives in all areas of life. This transformation in development seems to occur on an unconscious level. Students just habitually begin to perceive that such thinking is appropriate.

The most recognized instrument to measure Perry’s Positions¹⁸ is the Learning Environment Preferences (LEP), which numerous higher education institutions have used in research.¹⁹ The Learning Environment Preferences (LEP) is an instrument developed by William Moore, consisting of 65 items across five domains: (1) view of knowledge/learning; (2) role of the instructor; (3) role of the student/peers; (4) classroom atmosphere and activities; and (5) role of evaluation/grading.²⁰ According to Moore, “These domains focus on

student preferences for specific aspects of the classroom learning environment shown to be associated with increasing complexity on the Perry scheme of intellectual development.”²¹

Overview of the Study

This study was an effort to capture the experiences influencing the possible cognitive development of adult undergraduate students who are experiencing two different educational formats. There was no attempt to compare these experiences, but rather to understand each. The quantitative component involved a pretest and posttest comparison, using the LEP, to determine if an increase in cognitive development occurred. This instrument was administered within the first three weeks of the students’ beginning classes and within three weeks of the conclusion of the study period. Additionally, the difference between the pretest and posttest scores determined who would be interviewed.

The qualitative methods used by the researcher included classroom observations over a semester and student interviews at the conclusion of the experience. The 23 observations spanned the length of the research period. The researcher and co-rater described the student arrangement, setting, classroom environment, social environment (interactions between students before class and during breaks), the instructor’s communication style and engagement with students, and the interaction during the class session. The interactions were rated based on the “Steps for Better Thinking” rubric developed by Lynch, Wolcott, and Huber from Perry’s Positions.²² All observations encompassed the entire class session, which ranged from one to four hours. The observations gave the researcher the opportunity to learn about the students’ classroom environment and record the interactions.

Two universities were purposefully selected because they offered college courses at the general education level (freshman and sophomore level) and allowed adult students, who had never attended college previously, to begin these programs. They also offered programs in the same geographical area but delivered the educational experience using different formats. The semester experience at both institutions included the students in the first and second year program who were taking general education requirements.

University A provided adult students with a non-cohort format similar in length to a traditional semester. Intensive classes conducted for 16 weeks met in the evenings or Saturdays. One course met one hour a week (16 contact hours per semester) supplemented by videotapes and other assignments. The second type of course met once a week for three hours (48 contact hours per semester). The third type of course met four hours every other Saturday (32 contact hours per semester). All three types of courses earned four credit hours each. Students selected courses based upon their educational needs. At University A, because the students could choose the courses they wanted, the students in the study participated in a variety of four-credit courses: Sociological Imagination, English Composition, Computer Information Systems, Aesthetics in Art, Issues in American Politics, Aesthetics in Music, Discovering Psychology, Introduction to Business, or Introduction to Speech. Part-time instructors taught all courses. The researcher visited eight courses in order to gain a sample of 16 students meeting the criterion.

University B offered an accelerated cohort adult program with a lock-step design where students completed a three credit course every five weeks. The students participated in one course at a time. Class sessions occurred from 6:00 p.m. to 10:00 p.m. one night a week. In the first course of the program, students selected study

groups of four or five students who would work together on a weekly basis to complete learning assignments outside of class for a group grade. At University B, the students participated in these three credit courses: Introduction to Business Education; Foundations of Business Management; Written Communication; and Oral Communication. Part-time instructors taught all courses. Two cohort groups were incorporated into this study to gain a sample of 33 students.

The interviews were the final form of data collection. The pre-LEP CCI (Cognitive Complexity Indicator) score was subtracted from the post-LEP CCI score for each student. The difference scores from the pre-LEPs and post-LEPs were divided into natural clusters or groupings. Natural clusters are data groupings where the dataset breaks in pattern.²³ Nine students from each delivery model were selected for interviews across the range of difference scores. Students were selected to represent each natural cluster division of the difference scores. For the non-cohort, intensive format, the difference scores clusters were -30 to -23, -14 to 3, 20 to 29, and 43 to 68. For the cohort, accelerated format, the difference scores clusters were -80 to -27, -18 to 14, 20 to 30, 47 to 53, and 80 to 93. An equal mix of students from each delivery model performing across the range of difference scores was selected for interviews based on the quantitative results.

Research Findings

Demographic data were collected to describe the participants. Of the 49 students who started the study, 42 were still participating at the conclusion of the study. The average age of the students was 33. The majority of the students were female and Caucasian. They had an average of 14 years of full-time work experience. Over one third (39%) of the students had never attended a college or university prior to this time. The mean cumulative GPA for the sample population was 3.42.

The pre-LEP CCI recorded that all students began the programs at least at Position 2, "Multiplicity Pre-Legitimate". The CCI score for the pre-LEP results ranged from 220 to 444. Therefore, the students entered in Positions 2, 3, and 4 according to Perry's scheme. Analysis of the pre-LEP and post-LEP CCI scores demonstrated that some student scores increased, some stayed approximately the same, and others decreased. (See Table 1.) The range of scores for students in the non-cohort intensive schedule demonstrated an overall increase: Pre-LEP CCI scores range (220-386); and post-LEP CCI scores range (243-420). These ranges showed an overall gain by this group of students. The overall range for the students involved in the cohort program did not reflect the same increase: pre-LEP scores range (250-444); and post-LEP CCI scores range (257-407). Essentially, there was a decline in the overall range for the cohort model.

What about those students who recorded a decrease in CCI score from the pre-LEP to the post-LEP? The one common element for these students in the non-cohort model was that they did not move to a different position. If they decreased in CCI scores, they stayed within the score ranges for the position. For instance, the CCI calculation formula produces scores between 200 (a stable Position 2) and 500 (a stable Position 5).²⁴ One example of this was a student who scored 273 on the pretest and 243 on the posttest. Although the student score decreased, she did not change in position and remained at Position 2. Three students in the cohort program whose CCI score decreased moved from Position 3 to Position 2. Perry used the term "Retreat" to describe a regression to an earlier Position.²⁵ More specifically, Perry defined "Retreat" as "...entrenchment undertaken as a reaction to the complexities experienced in a more advanced Position."²⁶ Only one of these students was interviewed; his pretest CCI score was 307, and his posttest CCI score was 277. This student demonstrated that he was transitioning back to Position 3 by his comments.

In contrast to those students whose CCI score decreased, those whose CCI score increased sometimes demonstrated a change in Position. For instance, one student's score moved from 293 pre-LEP to 382 post-LEP while another's score moved from 274 pre-LEP to 354 post-LEP. Based on pre-LEP and post-LEP scores alone, seven students (16%) moved from Position 2 to Position 3 over the semester period. Two of these students were members of the intensive non-cohort model, and five were from the accelerated cohort format.

It was noted earlier that there was no increase in the overall range of the pre-LEP and Post-LEP scores for the cohort model. The majority of the students (68%) had a pre-LEP score in Position 3, and the post-LEP scores recorded 79% of the students in Position 3. The strength of the dominant Position in the group seemed to have kept the score range centered on Position 3. The dominant cognitive Position of the cohort group may have influenced the development of individual students. However, the effect was not developmental for the student at Position 4. This student was a member of the cohort program and scored solidly at "Relative Subordinate Position", Position 4, in her pre-LEP, post-LEP and analysis of her interview. In her interview, this student expressed frustration with her classmates and instructors who did not want to discuss material beyond the information level. This level of activity was also confirmed by classroom observations. Although there are many factors that affect each person's life, a question was raised about whether the cohort experience might also constrain a student's cognitive development.

Table 1
Difference Scores for Cognitive Complexity Indicators: Post-LEP Minus Pre-LEP

<i>Difference Scores</i>	<i>Intensive Non-Cohort Students</i>		<i>Accelerated Cohort Students</i>		<i>Total</i>	
	<i>Number n=14</i>	<i>Percentage</i>	<i>Number n=28</i>	<i>Percentage</i>	<i>Score Range</i>	<i>Percentage</i>
Increase	7	50%	13	46%	14 to 93	48%
Relative Stable	3	21%	3	11%	-6 to 6	14%
Decrease	4	29%	12	43%	-9 to -130	38%

Note: "LEP" stands for "Learning Environment Preference".

The remainder of this section focuses on analysis of the classroom observations and interviews which demonstrated how the instructor, peers, evaluations methods, and classroom atmosphere potentially affected the cognitive development or non-development of adult undergraduate students in this study. Results are described below.

The Instructor

Analysis of the interviews and classroom observations revealed that the instructors' techniques can have both a positive and a negative effect on students' cognitive development. Three categories of instructors emerged from the observations. Type 1 instructors lectured, showed videos, asked questions of the students on a factual basis, and appeared to be the expert. Type 2 instructors lectured, but involved the students by asking them questions about the reading. These instructors also asked students for their opinions but did not ask them to question their assumptions. Type 3 instructors modeled critical thinking skills, asked the students to substantiate their opinions, and used debate in the classroom. The students at different levels responded differently to these types of instructors.

In their interviews, students expressed a desire for an instructor who met the needs of their particular Position of cognitive development. The students in "Multiplicity Pre-Legitimate", Position 2, expressed that they believed their instructors were experts. These students were very comfortable with Type 1 instructors. The instructors who asked factual types of questions were a comfort to these students because there was one "Right" answer. In the non-cohort program, if instructors were Type 2 and asked for more discussion and sharing of opinions, these students remained quiet. The students in Position 3, "Multiplicity Subordinate", had a desire for an open discussion in the class and for instructors to bring real life experience to the classroom. The Type 2 instructors who facilitated discussion and added their experiences to the material met these students' needs. The Type 1 instructor frustrated these students. From the observations, these students appeared bored, played games on their cell phones, and acted disengaged in the classroom. The Relative Subordinate (Position 4) student interviewed was not challenged by her instructors. She stated that she experienced lecture, some discussion, and some application, but in her courses the instructors did not ask for analysis. Classroom observations confirmed she experienced only Type 1 and Type 2 instructors.

There were only two instructors out of 12 observed who displayed Type 3 characteristics. They continually empowered the students to analyze, question, and interrelate concepts. The discussion level in these two classrooms consistently reached more complex cognitive thoughts. Both of these instructors stated in class that they wanted their students to think critically and to not be afraid to argue with them. The instructors wanted their students to question what they (the instructors) said and express their viewpoints, especially if they were in opposition to the instructor's view.

It is interesting that the students in the Type 3 instructors' courses were at Position 3, which would have made them comfortable with a Type 2 instructor. These students, however, were not frustrated by these instructors' approaches. The students responded positively in the classroom, were engaged, asked questions, and participated in the debates. However, these two instructors used techniques to bring the students up to this (Instructor Type 3) level. They began the discussion with knowledge questions. Second, they asked for opinions and for opposing opinions. Finally, they asked the students to debate the issues. The students were never asked to jump to de-

bate without first discussing the topic. The techniques used by the Type 3 instructors coincide with Vygotsky's concept of scaffolding.²⁷ Scaffolding is giving support, clues, information, and reminders at the times that the student needs them and gradually allowing the student to think more independently. The students interviewed who participated in these two courses commented that each instructor was the best they had ever experienced and the course was their favorite. It made them interested in the topic. The course had "opened their eyes," and the students expressed a desire to continue learning. However, this limited exposure to a Type 3 instructor was not enough to move them to a more complex Position.

When instructors have students with different Positions in their classrooms, students may want a certain technique to match their level of cognitive development; however, this is not how growth occurs. Brookfield stated that one key to teaching critical thinking is to challenge students' old modes of thinking and provide structure and support for development of new ones.²⁸ Wlodkowski referred to this support as the "zone of proximal development", the phase in learning where students need assistance.²⁹ Education has the potential to be very powerful. It is only through challenging students that they develop and learn,³⁰ as was seen in this study. In summary, an instructor's techniques can affect the cognitive development of students. However, it is only through challenging and supporting the students that instructors can assist them in developing.³¹ If instructors stay in students' comfort zones, students are unlikely to develop.

Peers

The study group phenomenon in the cohort program played out strongly. One student at Position 2 interviewed appeared to be transitioning to the next Position. This student commented that study group members had something to contribute:

Yeah, I think they all bring something to the table. I think some more than others. Definitely some people shine in their writing.

This student further stated that he had learned from his mistakes and with the help of a study group member was improving his writing. His comments demonstrated that there was some acknowledgement that he could learn from his classmates in limited areas. Perry stated that students who begin to see their peers as sources of knowledge begin the process of transitioning to Position 3.³²

Students in Position 3, "Multiplicity Subordinate", liked hearing from their classmates and at times instigated discussions to hear others' viewpoints. The study group concept seemed to work well for these students, and they created close bonds with their study group members. The study groups grew so tight that they often wanted to outperform other groups on their presentations. One student stated:

And even within the classroom environment there's competition between the study groups. When you have group projects, all the groups are trying to outdo the other groups. I think that leads to some positive competition. It kind of makes people kind of go above and beyond what they typically would do, because they want... to provide a better presentation and show that they can put on a better presentation than the other groups.

Bandura's research described a concept called collective self-efficacy in which the group encouraged all members to pursue higher goals and to perform at higher levels.³³ Bandura further stipulated

that seeing their classmates perform successfully can raise the belief of the observers to also perform at that level or higher. Vicariously derived information alters perceived self-efficacy.³⁴

However, the study groups may have been a frustration for students who were not at the same Position as the others. This was the situation for the one student interviewed who was at Position 4. She did not find her classmates a source of knowledge; so the experience of working in a group was less desirable. This student made specific reference to names of two fellow study group members with whom she shared ideas and said it was beneficial to have them in her group. Upon review of the LEP scores for her study group, it was discovered that these two students recorded Position 3, "Multiplicity Subordinate", with CCI scores of 340 and 359. The students she did not enjoy in the group recorded LEP scores in Position 2, "Multiplicity Pre-Legitimate". Based upon this student's comments, study group or small group assignments may be beneficial if the fellow members are close to the same Position of cognitive development, but if there is a variance in the cognitive development, frustration may occur.

Mentkowski and associates found that experiences of working collaboratively in groups seemed to provide a stimulus for students to reflect.³⁵ As students listened to the viewpoints of others, they formed their own ideas, developed in their capacity to relate to others, and learned to appreciate what others had to contribute. In this study, the responses of students in the interviews concerning their study groups seemed to support this for the students in Positions 2 and 3. In summary, group interactions can influence cognitive development. Students who are at a lower Position in a group setting can be challenged by the others. This challenge assists them in developing more complex thinking skills. However, students who already possess more complex ways of thinking (e.g., the Position 4 student) may be frustrated with group members who are two Positions lower.

Evaluation methods

The evaluation methods that students identified positively fit the Position of their cognitive development. For example, students at Position 2 liked multiple choice tests, and students at Positions 3 and 4 liked essay exams and the opportunity to express themselves. However, in order for evaluative methods to be a positive influence on cognitive development, they must challenge students. While instructors need to keep in mind the Position of cognitive development of students in their classrooms, those who rely upon multiple choice exams requiring only factual information meet the needs of only a Position 2 student. However, as this limited study recorded, there are students at all different levels of cognitive development in each course. As referred to earlier, only two instructors stated to their students that they wanted them to think critically and then used questioning techniques during classroom discussions that supported this statement. These instructors also used essay exams as an evaluation method.

Brookfield stated that for critical thinking to be developed, two central activities are identifying and challenging assumptions and exploring alternative ways of thinking and acting.³⁶ A few evaluative methods that incorporate these are journaling, autobiography, analysis and research of controversial issues, and critical incidents. In addition, critical questioning must be used in the classroom.³⁷ In summary, the instructor's goal must be to assist students in developing more complex ways of thinking.³⁸ Instructors can push students to develop cognitively by the type of evaluative method chosen. Low

level knowledge questions do little to promote growth. The interview data showed that students in Positions 3 and 4 liked the opportunity to think outside the box and to create their own ideas. Instructors need to choose evaluative methods that allow students to explore their own ideas and give effective and prompt feedback to the students.

Classroom atmosphere

The classroom atmosphere may have been another dimension that either stifled or promoted cognitive development. Based on classroom observations, in one section of the introduction to business course in which the instructor showed videotapes and students never shared their opinions about the topic, students did not experience a discussion above the knowledge level (just the facts). The one new student in this course who completed the study stayed in the "Multiplicity Pre-Legitimate", Position 2. The second section of the introduction to business course where the instructor purposefully asked the students to think critically, analyze the material, and held debates in class continually held the students at a higher level. The two new students in this section increased their LEP CCI in the "Multiplicity Subordinate", Position 3. These students commented on the open classroom, and they made positive comments about being able to express their opinions in class. They believed that others were respectful of their opinions even if they disagreed. Students liked being able to disagree with the instructor and debate issues.

Brookfield and Preskill stated that "discussion is one of the best ways to nurture growth."³⁹ It is only through collaboration and co-operation with others that students are exposed to different views.⁴⁰ The students in this study supported the position of Brookfield and Preskill when they commented that at times the classroom discussions caused them to change their perspective. In summary, the classroom atmosphere can contribute to the cognitive development of the students. If the classroom is open to diverse opinions and students can share freely and honestly, then through this discussion students may be challenged and their assumptions examined. If the classroom atmosphere does not allow students this type of dialogue, they are likely to remain stagnant at their cognitive Position.

Conclusion

What experiences potentially influenced adult undergraduate students' development or non-development of cognitive complexity? The instructor had a key role in the students' development of more complex cognitive thinking. The instructor was responsible for the techniques used in the classroom, the creation of the classroom atmosphere where students could express themselves, and the choice of evaluation methods to include small group assignments. Two instructors used questioning techniques in the classroom, which caused the level of classroom discussion to be more complex. For these two instructors, it was a conscious decision to use critical thinking techniques and evaluative methods in their courses that allowed students to express their opinions and debate issues. They both stated this to the students in class sessions observed. Kegan indicated that the instructor has a key role in creating the learning environment and building a bridge to help the student's progress to more cognitive complex thinking.⁴¹ The results of this study reinforced that idea.

Interaction with other students had a role in the cognitive development. Small group assignments also seemed to have contributed to the students' cognitive development. All students from the cohort

program were required to be members of a study group and required in every course to complete small group assignments. Most of the students interviewed consistently spoke of their study group members as a positive influence on their learning. As one student stated, "You have all those minds to pick from, all those different opinions." However, too much spread in the Positions within a study group may cause some frustration, as evidenced by the one student interviewed at the "Relativism Subordinate" Position 4. She was able to connect with only two other students in her group of five. These students were just one position below her based on their LEP scores, but she was frustrated with others who were two positions lower.

This study looked at specific influences on the cognitive development of adult students in two settings. The results of this study demonstrated that some students increased in cognitive complexity according to Perry's scheme. From this study, one cannot identify a single experience that is solely responsible for assisting students in developing more complex ways of thinking. It is possible to state that adults are not stagnant in their cognitive development and that participation in higher education provides multiple avenues for development. In this study, instructor techniques, discussion with peers, evaluation methods, and classroom atmosphere were investigated. All of these had the potential to assist students in developing more complex ways of thinking.

Endnotes

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The CADRE Project: Looking at the Development of Beginning Teachers

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The CADRE Project is a collaborative teacher induction effort between higher education and K-12 practitioners. The Metropolitan Omaha Educational Consortium (MOEC), comprised of seven metropolitan Omaha public school districts and the University of Nebraska at Omaha College of Education, coordinates this project. This project is a true collaborative effort involving public school superintendents, university administrators, and faculty and staff from both entities. The acronym CADRE refers to the overriding goal of Career Advancement and Development for Recruits and Experienced Teachers, and the project creates a framework of growth and development within the teaching profession, thus building a CADRE of outstanding teachers. The project, which began in 1994, provides a yearlong teaching experience for newly certified teachers who are also completing a specially designed master's degree program. The structured first year teaching experience includes a wide variety of professional learning experiences designed to assist CADRE teachers in reaching a level of professional skill and judgment that characterizes a well-qualified teacher.

This experience provides practical teaching techniques and strategies along with feedback on the classroom application of teaching strategies. The CADRE teacher has access to formal mentoring as well as graduate work focusing on the synthesis of various learning theories. The project also provides opportunities for veteran classroom teachers, CADRE Associates, who are master teachers selected by their respective districts to serve in this role for a two to three year period. They assume alternative responsibilities, which include mentorship of two CADRE teachers, district-designated roles, and university related work. Linking beginning teachers to veteran master teachers while incorporating university coursework specifically targeted to first year teachers' needs, collaborative inquiry, professional

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conversation with peers and mentors, and reflection about teaching experience has proved to be a powerful combination. It is not enough just to bring a novice and an experienced teacher together. Effective induction of beginning teachers must be linked to a vision of good teaching, guided by an understanding of teacher learning, and supported by a professional culture that favors collaboration and inquiry.

Review of Literature

During the 1980s, educators began to regard support and assistance for beginning teachers as a key component of reform in teaching. The high rate of teacher attrition during the first three years of teaching, as well as an awareness of the problems faced by beginning teachers, led to the logic of providing on site support and assistance, such as induction programs, during the first year of teaching. A critical component of effective on-site induction programs is mentoring. Pending teacher shortages and projections of large numbers of new teachers entering U.S. schools in the next decade¹ have led to a rapid increase in mandated mentoring support for beginning teachers as a necessary component of teacher induction.²

Teacher induction is the process of supporting the work of beginning teachers so that they adjust successfully to the new teaching environment and social system of the school, understand their responsibilities, and become professionally competent as quickly as possible.³ For over a decade, reformers and policymakers have called for induction programs. Research supports that quality teacher induction programs include particular components, such as effective mentoring, academic coursework, and peer cohorts.⁴

Effective Mentoring

Effective mentoring is one component of quality teacher induction programs. The mentor is a teacher, advisor, sponsor, guide, coach, and confidante.⁵ In the California Mentor Teacher Program, for example, mentors represent an outstanding group of teachers who have the training and expertise necessary to help newcomers.⁶ Beginning teacher induction programs with mentors in key roles refer to planned programs intended to provide systematic and sustained assistance to beginning teachers for at least one school year.⁷ Investigations into mentoring indicate numerous benefits for the new teacher as well as for the veteran teacher.⁸ For example, Fox and Singletary found that successful assistance provides "...new teachers with skills that will assist them in developing methods for problem solving and transferring the theories learned in preservice training to appropriate teaching practices."⁹ By promoting observation and conversation about teaching, mentoring is believed to help teachers develop tools for reflection on and continuous improvement of teaching practice.

The variety of mentoring approaches indicates that there is no one best way to mentor. Mentoring involves highly personal interactions that are best defined by those who carry them out. Yet both the research and professional literature on teacher induction supports particular components as being important aspects of effective mentoring programs, such as: (a) mentor preparation; (b) released time for mentors to spend with beginning teachers; (c) reflective seminars on teaching practice during which mentors instruct and debrief beginning teachers; (d) trust between mentor and beginning teacher; and (e) selection of local professional who are already acculturated in the same school or district as mentors.¹⁰

First, given that the mentoring relationship is very complex, mentor preparation increases the chances of effective mentoring. Preparation includes opportunities for mentors to analyze their own beliefs about learning to teach and to articulate their practical knowledge of teaching.¹¹ Second, released time is needed to enable mentors to spend time with novice teachers in the classroom and one-on-one before and after school. This time is essential for coaching to occur when the beginning teacher is ready to learn, when the needs, questions, and problems arise. Third, reflective seminars with mentors and beginning teacher peers promote the application of appropriate educational theory to practice. Fourth, trust is seen as the foundation for thoughtful dialogue and coaching that leads to reflective teaching practice.¹² Lastly, acculturated mentors, or those who know the school culture because of having already taught in that setting, are better equipped to coach novices on how to adjust and navigate first year teaching successfully.

Academic Coursework

Another component of quality teacher induction is appropriate academic coursework. Academic coursework provides current research on good teaching practices at a time when beginning teachers need ideas of what to do in the classroom. Knowledge of pedagogy is connected to content and actual classroom practice through discussion, readings, projects, as well as by trial and error. Through knowledge and application of credible teaching theory, novice teachers gain confidence as they question; look for alternatives; and revise and develop their own pedagogical content knowledge,¹³ as well as their own personal practical theories of teaching.¹⁴

Peer Cohorts

Having peer cohorts is a third component of quality teacher induction programs. A peer cohort is a group of novice teachers who participate together in an induction program. As they share stories of their first year tragedies and triumphs, they form a support network for their academic coursework. This network of novice teachers also engages in reflection on practice during and outside formal classes

and seminars with peers as well as with mentors. Teachers should engage in reflection on their own actions, actions of their students, and the context of teaching in order to make appropriate decisions.¹⁵

Purpose and Design of the Study

From the beginning, the CADRE project was designed to make a difference in the induction experience of beginning teachers. The evaluation of the CADRE project was designed to assess whether the needs of the beginning CADRE teachers were being met. In other words, was the CADRE experience giving beginning teachers what they needed to succeed in teaching? In order to assess teaching success, we chose to observe and evaluate the beginning teachers' teaching skill levels in their classroom settings. The research was designed to address two-research questions: (1) What are the skill levels of beginning teachers (strengths and weaknesses)? and (2) Does participation in CADRE make a difference in skill acquisition?

The study focused on beginning teachers having one through five years of experience. Half of the teachers studied completed the CADRE project, and half were selected by researchers in order to achieve a matched pair design to control for years of teaching experience, subjects taught, grade levels taught, and school context. Data presented cover a six- year period 1997-2003, with 38 to 42 teachers were studied each year. Overall, we studied 115 CADRE teachers and 115 non-CADRE teachers, matched pairs, giving our study a total of 230 participants.

The instrument used to evaluate the skill level of beginning teachers was "A Continuum of Effective Teaching Skills," which is based on a prior instrument, "A Developmental Continuum of Teacher Abilities," developed by Moir, Freeman, Petrock, and Brown.¹⁶ The instrument is broken down into three domains of teacher skills: Domain #1= Organizing and Managing the Classroom/Creating a Positive Learning Environment; Domain #2= Delivering Instruction to All Students; and Domain #3= Demonstrating Subject Matter Knowledge. Each domain contains three to four subdomains, for a total of ten subdomains as shown in the textbox below.

A Continuum of Effective Teaching Skills: Domains and Subdomains

Domain #1

Organizing and Managing the Classroom/Creating a Positive Learning Environment

- Subdomain A: Managing Student Behavior
- Subdomain B: Organizing the Physical Environment
- Subdomain C: Establishing Rapport and Relationships with and Between Students
- Subdomain D: Whole Group Instruction and Use of Collaborative Activities

Domain #2

Delivering Instruction to All Students

- Subdomain A: Using Effective Strategies for Responsive Teaching
- Subdomain B: Use of Student Prior Knowledge and Higher Order Thinking Skills
- Subdomain C: Selecting and Adapting Materials and Resources

Domain #3

Demonstrating Subject Matter Knowledge

- Subdomain A: Understanding Subject Matter
- Subdomain B: Using Appropriate Strategies to Teach Subject Matter
- Subdomain C: Selecting, Critiquing, and Adapting Learning Materials that Reflect Student Diversity

The subdomains are divided into 27 subskills which are described in the next section on results. Each subskill was scored as follows:

- Beginning Level = skill is not demonstrated; assigned a value of 1;
- Emerging Level = skill is demonstrated in rudimentary form; assigned a value of 2;
- Developing Level = skill is demonstrated; assigned a value of 3;
- Integrating Level = skill is demonstrated frequently; assigned a value of 4;
- Innovating Level = skill is demonstrated consistently with expertise; assigned a value of 5.¹⁷

The instrument was used by trained observers (CADRE Associates) who were assigned to observe two to three beginning teachers four times over the course of a school year at pre-determined times. The observers did not know if they were observing a CADRE teacher or a non-CADRE teacher. Also, the observers were assigned to participants outside their own school districts in order to minimize personal bias. The classroom visits made by the researchers typically lasted at least one hour, giving the researchers time to see a variety of teaching skills demonstrated.

Results

Domain #1: Organizing and Managing the Classroom/Creating A Positive Learning Environment

For subskills A1 through A5 of subdomain A, researchers observed the skills needed to manage student behavior, such as the pacing of the curriculum and the establishment of routines and procedures. For this subdomain, "Managing Student Behavior", 80.52174% of CADRE teachers demonstrated skill levels of 3 or better compared to 52.34783% of Non-CADRE teachers. Thus, 28.17391% more CADRE Teachers achieved a 3 or better skill level. (See Table 1.1.) For subskills B1 through B4 of subdomain B, researchers observed the skills needed to orchestrate the physical classroom environment, such as room arrangements, grouping, materials accessibility, and movement around the classroom. For this subdomain, "Organizing the Physical Environment", 80.43478% CADRE teachers were rated at 3 or above versus 61.08696 % of non-CADRE teachers, a difference of 19.34782%. (See Table 1.2.)

For subskills C1 through C4 of subdomain C, researchers evaluated the teachers' social interaction patterns and student rapport. For this subdomain, "Establishing Rapport and Relationships with and Between Students", they found 83.91304% of CADRE teachers performing at 3 or better compared to 61.73913% of non-CADRE teachers scoring, a difference of 22.17391%. (See Table 1.3.) For subskills D1 through D2 of subdomain D, researchers evaluated whole group instruction and the use of collaborative activities. For this subdomain, they found 82.17391% of CADRE participants scored 3 or above while the percentage for non-CADRE participants was 51.73913%, a difference of 30.43478%. (See Table 1.4.)

Domain #2: Delivering Instruction to All Students

For subskills A1 through A3 of subdomain A, researchers observed the knowledge and implementation of effective teaching strategies. For this subdomain, "Using Effective Strategies for Responsive Teaching", 89.27536% of CADRE teachers scored 3 or better versus 57.97101% of non-CADRE teachers, a difference of 31.30435%. (See Table 2.1.) For subskills B1 through B2 of subdomain B, researchers

evaluated teachers' use of student prior knowledge and higher order thinking skills. For this subdomain, they found 79.56522% of CADRE teachers performing at 3 or better level while the percentage for non-CADRE was 49.13043%, a difference 30.43479%. (See Table 2.2). For subskill C1 of subdomain C, researchers evaluated teachers' use of a variety of resources. For this subdomain, "Selecting and Adapting Materials and Resources", they found 86.95652% of CADRE participants scored 3 or better as compared with 50.43378% of non-CADRE participants, a difference of 36.52174%. (See Table 2.)

Domain #3: Demonstrating Subject Matter Knowledge

For subskills A1 through A3 of subdomain A, the researchers observed subject knowledge, integration, and concept clarification. For this domain, "Understanding Subject Matter", 85.7971% of CADRE teachers scored 3 or better compared with 62.6087% of non-CADRE teachers, a difference of 23.1884%. (See Table 3.1.) For subskills B1 through B2 of subdomain B, the researchers evaluated the teachers' subject matter knowledge and teaching strategies. For this subdomain, "Using Appropriate Strategies to Teach Subject Matter", 93.04348% of CADRE teachers performed at the 3 or better level as compared with 53.91304% of non-CADRE participants, a difference of 39.13044%. (See Table 3.2.) For subskill C1 of subdomain C, researchers evaluated the teachers' use of learning materials that reflect students' diversity. For this subdomain, "Selecting, Critiquing, and Adapting Learning Materials that Reflect Student Diversity", 86.95652% of CADRE teachers performed at the 3 or better level as compared with 45.21739% of non-CADRE teachers, a difference of 41.73913%. (See Table 3.3.)

Analysis and Conclusions

First year teachers, in both the CADRE and non-CADRE groups, began with very similar skill levels. However, the CADRE teachers were able to move beyond their non-CADRE counterparts in all domains of teacher skills over the five-year timeframe. As such, there are skill areas that show differences worth highlighting.

First, CADRE teachers had the largest difference in the percentage of teachers scoring 3 or better in comparison to their non-CADRE teacher matches in the following areas, in rank order:

- Selecting, Critiquing, and Adapting Learning Materials that Reflect Student Diversity (41.73913%)
- Using Appropriate Strategies to Teach Subject Matter (39.13044%)
- Selecting and Adapting Materials and Resources (36.52174%)

These skill areas represented the top three skills mastered by 86% or more of the CADRE teachers.

Second, the skill areas that represented the highest percentage of CADRE teachers scoring 3 or better were, in rank order:

- Using Appropriate Strategies to Teach Subject Matter (93.04348%)
- Using Effective Strategies for Responsive Teaching (89.27536%)
- Selecting, Critiquing, and Adapting Learning Materials that Reflect Student Diversity (86.95652%)

It is important to note that two of the teaching skills showed up in both categories, emphasizing their importance, and netting four skill areas of CADRE teachers' greatest strength and growth.

Table 1
Domain #1 Results:
Organizing and Managing the Classroom/Creating a Positive Learning Environment

Table 1.1
Subdomain A: Managing Student Behavior
Subskills A1 through A5

SCORE	1 - Beginning	2 - Emerging	3 - Developing	4 - Integrating	5 - Innovating
CADRE Participants	35	77	198	181	84
	6.086957%	13.3913%	34.43478%	31.47826%	14.6087%
Non-CADRE Participants	98	176	190	88	23
	17.04348%	30.6087%	33.04348%	15.30435%	4%
% of CADRE participants scoring 3-5:					80.52174%
% of non-CADRE participants scoring 3-5:					52.34783%
% Difference between CADRE & non-CADRE:					28.17391%

Table 1.2
Subdomain B: Organizing the Physical Environment
Subskills B1 through B4

SCORE	1 - Beginning	2 - Emerging	3 - Developing	4 - Integrating	5 - Innovating
CADRE Participants	30	60	152	125	93
	6.521739%	13.04348%	33.04348%	27.17391%	20.21739%
Non-CADRE Participants	61	118	159	93	29
	13.26087%	25.65217%	34.56522%	20.21739%	6.304348%
% of CADRE participants scoring 3-5:					80.43478%
% of non-CADRE participants scoring 3-5:					61.08696%
% Difference between CADRE & non-CADRE:					19.34782%

Table 1.3
Subdomain C: Establishing Rapport and Relationships With and Between Students
Subskills C1 through C4

SCORE	1 - Beginning	2 - Emerging	3 - Developing	4 - Integrating	5 - Innovating
CADRE Participants	23	51	162	128	96
	5%	11.08696%	35.21739%	27.82609%	20.86957%
Non-CADRE Participants	63	113	151	106	27
	13.69565%	24.56522%	32.82609%	23.04348%	5.869565%
% of CADRE participants scoring 3-5:					83.91304%
% of non-CADRE participants scoring 3-5:					61.73913%
% Difference between CADRE & non-CADRE:					22.17391%

Table 1
Domain #1 Results Continued

Table 1.4
Subdomain D: Whole Group Instruction and Use of Collaborative Activities
Subskills D1 through D2

SCORE	1 - Beginning	2 - Emerging	3 - Developing	4 - Integrating	5 - Innovating
CADRE Participants	11	30	77	68	44
	4.782609%	13.04348%	33.47826%	29.56522%	19.13043%
Non-CADRE Participants	38	73	70	27	22
	16.52174%	31.73913%	30.43478%	11.73913%	9.565217%
% of CADRE participants scoring 3-5:					82.17391%
% of non-CADRE participants scoring 3-5:					51.73913%
% Difference between CADRE & non-CADRE:					30.43478%

The CADRE teachers' scores exceeded those of their non-CADRE counterparts for all twenty-seven teaching subskills. What follows is an explanation of how the CADRE teachers' four strongest teaching skill areas related to the CADRE induction program:

- Using Appropriate Strategies to Teach Subject Matter
- Using Effective Strategies for Responsive Teaching
- Selecting, Critiquing, and Adapting Learning Materials that Reflect Student Diversity
- Selecting and Adapting Materials and Resources

These findings can be tied to the content and scope of the induction program. First, the skill of "Using Appropriate Strategies to Teach Subject Matter" includes not only knowledge of subject content but also knowledge of strategies specific to effective teaching of particular content. The connection between the CADRE project and the positive development of subject matter knowledge and teaching strategies can be found in the emphasis on the academic coursework and, perhaps most clearly, in mentoring relationships. For example, the beginning teacher often has an adequate command of the content but is unsure how best to teach the concepts. It is here that the mentor teacher is able to coach the novice toward a strong pedagogical content knowledge that builds the CADRE teacher's efficacy.

In addition, the CADRE teachers' development of a skilled variety in the area of "Using Effective Strategies for Responsive Teaching" can be tied to the aspect that CADRE teachers have multiple opportunities to revisit effective teaching strategies with their mentor as well as during coursework and seminars. CADRE teachers have opportunities to practice the teaching strategies presented and to debrief with peers about their results. Reflection is strongly correlated with teacher growth and development, and this is an essential skill that is developed and assessed throughout the CADRE Project.

Finally, the CADRE teachers' enhanced facility in "Selecting, Critiquing, and Adapting Learning Materials that Reflect Student Diversity" and the high proportion demonstrating the skill, "Selecting and Adapting Materials and Resources" may also be related to the induction program. During coursework and through mentors, the CADRE project introduces the beginning teacher to a plethora of resources and ways to differentiate instruction to meet individual students' needs. The mentors are adept at accessing district level

resources and help the new teachers to do so as well. Beginning teachers are continually introduced to new and better resources in timely ways during seminars and coursework, and through mentoring. This encourages the use of and experimentation with a variety of resources to meet students' learning needs.

The CADRE project promotes competence and growth in teaching skills through mentoring, coursework, and cohort /peer support group. The new teacher has the opportunity to reflect on practice and theory with the help of a veteran teacher. These components have proven to be a powerful combination, primarily because they are experienced simultaneously during the first year of teaching. It is during the first years of practice that the beginning teacher is most receptive to assistance and support. While progress and growth in teaching can occur at anytime, it is perhaps most useful in the early stages. This induction program is making a difference in the ability of new teachers to crack the code of teaching and remain in a solid professional growth mode. Further, our research demonstrated that teacher growth continued five years following the CADRE induction experience. Our goal is to help beginning teachers make timely progress as successful teachers. Based on our data, we believe that CADRE has made an important contribution to the overall success of our novice teachers.

Table 2
Domain #2 Results: Delivering Instruction to All Students

Table 2.1
Subdomain A: Using Effective Strategies for Responsive Teaching
Subskills A1 through A3

SCORE	1 - Beginning	2 - Emerging	3 - Developing	4 - Integrating	5 - Innovating
CADRE Participants	12	25	97	120	91
	3.478261%	7.246377%	28.11594%	34.78261%	26.37681%
Non-CADRE Participants	55	90	120	75	5
	15.94203%	26.08696%	34.78261%	21.73913%	1.449275%
% of CADRE participants scoring 3-5:					89.27536%
% of non-CADRE participants scoring 3-5:					57.97101%
% Difference between CADRE & non-CADRE:					31.30435%

Table 2.2
Subdomain B: Use of Student Prior Knowledge and Higher Order Thinking Skills
Subskills B1 through B2

SCORE	1 - Beginning	2 - Emerging	3 - Developing	4 - Integrating	5 - Innovating
CADRE Participants	8	39	59	82	42
	3.478261%	16.95652%	25.65217%	35.65217%	18.26087%
Non-CADRE Participants	42	75	85	21	7
	18.26087%	32.6087%	36.95652%	9.130435%	3.043478%
% of CADRE participants scoring 3-5:					79.56522%
% of non-CADRE participants scoring 3-5:					49.13043%
% Difference between CADRE & non-CADRE:					30.43479%

Table 2.3
Subdomain C: Selecting and Adapting Materials and Resources
Subskill C1

SCORE	1 - Beginning	2 - Emerging	3 - Developing	4 - Integrating	5 - Innovating
CADRE Participants	0	15	46	36	18
	0%	13.04348%	40%	31.30435%	15.65217%
Non-CADRE Participants	13	44	30	18	10
	11.30435%	38.26087%	26.08696%	15.65217%	8.695652%
% of CADRE participants scoring 3-5:					86.95652%
% of non-CADRE participants scoring 3-5:					50.43378%
% Difference between CADRE & non-CADRE:					36.52174%

Table 3
Domain #3 Results: Demonstrating Subject Matter Knowledge

Table 3.1
Subdomain A: Understanding Subject Matter
Subskills A1 through A3

SCORE	1 - Beginning	2 - Emerging	3 - Developing	4 - Integrating	5 - Innovating
CADRE Participants	7	42	115	127	54
	2.028986%	12.17391%	33.33333%	36.81159%	15.65217%
Non-CADRE Participants	28	101	135	66	15
	8.115942%	29.27536%	39.13043%	19.13043%	4.347826%
% of CADRE participants scoring 3-5:					85.7971%
% of non-CADRE participants scoring 3-5:					62.6087%
% Difference between CADRE & non-CADRE:					23.1884%

Table 3.2
Subdomain B: Using Appropriate Strategies to Teach Subject Matter
Subskills B1 through B2

SCORE	1 - Beginning	2 - Emerging	3 - Developing	4 - Integrating	5 - Innovating
CADRE Participants	5	11	104	92	18
	2.173913%	4.782609%	45.21739%	40%	7.826087%
Non-CADRE Participants	34	72	80	32	12
	14.78261%	31.30435%	34.78261%	13.91304%	5.217391%
% of CADRE participants scoring 3-5:					93.04348%
% of non-CADRE participants scoring 3-5:					53.91304%
% Difference between CADRE & non-CADRE:					39.13044%

Table 3.3
Subdomain C: Selecting, Critiquing, and Adapting Learning Materials that Reflect Student Diversity
Subskill C1

SCORE	1 - Beginning	2 - Emerging	3 - Developing	4 - Integrating	5 - Innovating
CADRE Participants	6	9	47	44	9
	5.217391%	7.826087%	40.86957%	38.26087%	7.826087%
Non-CADRE Participants	16	47	42	8	2
	13.91304%	40.86957%	36.52174%	6.956522%	1.73913%
% of CADRE participants scoring 3-5:					86.95652%
% of non-CADRE participants scoring 3-5:					45.21739%
% Difference between CADRE & non-CADRE:					41.73913%

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Appendix
Sample Page of Instrument: A Continuum of Effective Teaching Skills

Domain #1: *Organizing and Managing the Classroom/Creating a Positive Learning Environment*
Sub Domain A: *Managing Student Behavior*

	<i>Beginning</i>	<i>Emerging</i>	<i>Developing</i>	<i>Integrating</i>	<i>Innovating</i>
A - 1	May establish expectations for student behavior without modeling or reinforcing them.	Occasionally states and reinforces expectations for student behavior.	Regularly states, models, and reinforces expectations for student behavior.	When necessary, reinforces expectations through a variety of strategies to assist students in taking responsibility for their own behavior.	Expectations are clearly demonstrated through consistently internalized student behavior.
A - 2	Recognizes some disruptive student behavior; may respond only to negative behaviors. Focuses attention on presenting lesson.	Responds using limited strategies to reinforce positive behavior. Occasionally monitors behavior while teaching.	Uses some prevention or intervention strategies to reinforce positive and alter negative behavior. Monitors behavior while teaching.	Frequently uses prevention and intervention strategies to foster student responsibility. Encourages students to monitor their own behavior.	Consistently uses prevention and intervention strategies to foster student responsibility. Teacher and students consistently monitor behavior.
A - 3	Recognizes the need for routines and procedures to accomplish regular classroom activities, but does not have them in place.	May use some routines and procedures to facilitate classroom activities.	Use some routines, procedures, and transitions to facilitate classroom activities.	Frequently uses routines, procedures, and transitions to facilitate classroom activities.	Consistently uses routines, procedures, and transitions to facilitate classroom activities.
A - 4	Teaches or manages activities from one place in the classroom without circulating among students.	Occasionally establishes proximity to students during some activities.	Establishes some proximity to students during instruction and activities to facilitate student engagement.	Frequently establishes proximity to students during instruction and activities to facilitate student engagement.	Consistently establishes proximity to students during all instruction and activities to facilitate student engagement.

How Much Do Schools and Districts Matter? A Production Function Approach to School Accountability¹

James L. Phelps and Michael F. Addonizio

In 1989, President George H.W. Bush convened a first-ever education summit in Charlottesville, Virginia, with the governors of the states and territories. At this unprecedented summit, political leaders at the federal and state levels agreed to establish national education goals for America's elementary and secondary schools. This national focus on education goals culminated in the 1994 passage by the U.S. Congress of legislation declaring that "all students can learn and achieve to high standards and must realize their potential if the United States is to prosper."²

The 1994 reauthorization of the Elementary and Secondary Education Act of 1965 established Adequate Yearly Progress (AYP) as the accountability measure for Title I schools and districts. Each state was required to develop its own formula based on state assessments in at least reading and mathematics. States varied considerably in their approaches to AYP, with the result that Title I schools and districts were held to different standards across the states. The 2001 reauthorization of Title I, the No Child Left Behind (NCLB) Act, sought to bring more uniformity to the states' AYP requirements. This legislation also substantially changed how AYP results are used, focusing on low-performing Title I schools and offering educational alternatives to their students.

Under NCLB, schools and districts that fail to make AYP for two consecutive years are required to undergo a set of reforms and sanctions designed to improve student achievement. The scope of these reforms and sanctions widens as a school continues to fall short of AYP requirements to include the offer of transfer to children who wish to leave the school, the provision of supplementary educational services outside of the normal school day, the replacement of school staff, and the conversion of the school to charter status. New requirements and sanctions are also imposed on school districts that fail to make AYP, including the withholding of funds by the state, replacement of district staff, and the abolition or reorganization of the district.

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In response to these federal mandates, the states have adopted or refined outcome goals for schools and students and placed new emphasis on school accountability for student achievement. States are now devoting considerable attention to the task of distinguishing between effective and ineffective schools. Much less attention, however, has been given to the task of identifying effective school districts despite the considerable emphasis placed on district as well as school performance by NCLB. This joint focus on school and district performance raises the question: How do district policies, leadership, and support services influence the quality of teaching and learning in public schools? This article uses a rich longitudinal school-level database to estimate a model of student achievement and analyzes the residuals in the model to obtain estimates of the contributions of unobserved school and school district characteristics to student performance. The second section of the paper reviews recent research on current approaches to determining school quality on the basis of student achievement test scores. Section three presents an alternative approach to assessing school and district effectiveness using an educational production function. A production function model is specified in the fourth section, and empirical results are presented in section five. A summary of findings is presented in the final section, along with implications for state and federal policy and programs regarding school accountability.

The School Accountability Movement in the United States

By 2000, 48 states had implemented standardized testing, including tests in mathematics and English/language arts or reading, as an integral part of statewide school accountability programs.³ The other two states— Iowa and Nebraska— require their districts to test students in specified grades or grade spans. Other elements of this educational reform movement include standards for student and school performance, teacher competency testing, and school accreditation programs which often include recognition and rewards for high performance and assistance and, in many states, sanctions for poor performance. These elements of performance-based school reform were emphasized in the 1994 reauthorization of the federal Title I program as well as many state reform initiatives.⁴ Thirty-three states have set performance goals for schools or districts and use the results of state assessments to hold these units accountable for meeting these outcome goals.

These performance-based reforms respond to school critics who have cited the lack of sufficient incentives for schools to improve the quality of teaching and learning;⁵ that is, these reforms seek to provide such incentives by developing measures of student achievement and school quality and tying financial and other rewards to those measures. Such rewards may take the form of school-level financial bonuses or statewide public recognition for excellence. Of course, such recognition may also translate directly into school district financial rewards in the context of inter-district school choice programs, where high performing schools attract residents of neighboring districts.

The creation of effective incentives, however, depends crucially on the valid and reliable measurement of school performance. Increasingly, policymakers agree that school performance should be measured in terms of the academic performance of the students in the school. The most prevalent measure of school performance is average test score levels among students in a particular grade. Test score levels are often reported in terms of the percentage of students

at a school scoring in particular ranges, such as the proportion failing, proficient or advanced. It is also understood, however, that any measure of school performance that is based on student performance should account for differences in student characteristics (particularly socioeconomic) and school resources. School level scores fail to do this.

A number of states base school building accountability systems on comparisons of student achievement test scores from one year to the next; that is, states compare the achievement of students at selected grades in a given year with the achievement of students from the previous year at the same grade in the same school. Such change scores are clearly superior to single-year level scores as an indicator of school quality because they provide a control for the different endowments and starting points of the students. However, as Linn and Haug observed, such comparisons of student performance at a grade level across years assume that student characteristics that affect achievement levels are relatively stable from year to year for students attending a given school. This assumption, while reasonable for most schools, is invalid for schools in neighborhoods undergoing rapid demographic and economic change.

Other important determinants of student performance may change as well, confounding the interpretation of change scores as indicators of school quality. Kane and Staiger have shown that a substantial portion of the variability in schools' change scores is due to non-persistent factors such as an extended leave of a teacher, a teacher strike, or changes in rules regarding test taking, that affect test scores in one year but not the next. Examining fourth-grade math scores from North Carolina, Kane and Staiger estimated that only about one fourth of the variance in school change scores was attributable to persistent factors associated with the school.⁶ Linn and Haug, using data from Colorado's fourth grade reading assessments, computed two change scores (change in percent of students proficient or advanced) for each of 734 schools, one from 1997 to 1999 and one from 1998 to 2000, and found a correlation of $-.03$ between them.⁷ The authors concluded that "there is a complete lack of stability in the two-year change scores. Knowing the magnitude of the gain or loss in percent proficient or advanced from 1997 to 1999 tells you essentially nothing about the change from 1998 to 2000".⁸

School change scores, then, are flawed indicators of real change in school quality. They are influenced not only by measurement error, but also by changes in the student population and in the teaching staff, making their interpretation as indicators of effective or failing schools problematic. A third approach to inferring school performance on the basis of student test scores uses the average gain in test performance between the end of one grade and the end of the next grade. This cohort gain or "value-added" approach, which compares the performance of this year's fourth-grade students with their own performance in third grade, requires states to invest in data systems that link test scores of individual students across years. This approach is used in a handful of states including Arizona, North Carolina and Tennessee. Test score changes and gains are generally viewed as less biased than level scores as a means of comparing schools serving different student populations. They are, however, more difficult to measure reliably.⁹ Moreover, school gain scores have been found to be positively correlated with the proportion of white and nonpoor students, thus confounding their interpretation as measures of school effectiveness.¹⁰

Further, the assessment of *district* quality, also required by NCLB, is similarly confounded. Indeed, even assuming away these problems in interpreting school change scores, what is to be inferred about the performance of a school district in which most but not all schools show improvement over a change cycle? The quality of district leadership, policies, communications, and school supports is difficult to discern through the use of school change scores. A more valid and reliable assessment of school and district effectiveness requires more information. Such an assessment is outlined in the next section.

Assessing School Performance: A Production Function Approach

To accurately estimate the "quality" of a school, that is, the school's contribution to student learning, one must account for the relative contributions of children's families, communities, peers, and school resource levels to student learning. Put another way, one should not confound school quality with other fundamental determinants of student performance, particularly when assessments of school quality trigger school rewards and sanctions.

One approach to developing school performance measures relies upon the concept of production efficiency and techniques for measuring such efficiency. This approach utilizes the economist's notion of a production function.¹¹ Production models have three parts: the outcomes sought, the necessary ingredients or inputs, and the process that transforms inputs into outcomes. These three parts are linked together by a production function. This production function reveals the maximum amount of outcome possible for various combinations of inputs. If the supply levels of the various inputs are known and the production function is also known, the maximum level of outcome (i.e., production) can be determined. Anything short of maximum attainable output indicates technical inefficiency.

A second dimension to production efficiency involves input costs. Consider, for example, two alternative educational programs that utilize different input combinations to produce the same outcome, say, the ability to do mathematics at a specified level. While both programs involve teachers' time, textbooks, worksheets, and the like, one may emphasize student-teacher contact while the other relies heavily on computer-assisted self-instruction. Assuming that each program makes the best possible use of each set of inputs—that is, each program is technically efficient—the less-costly input combination is preferred on allocative efficiency grounds. Put another way, production efficiency requires both technical and allocative efficiency.

Analysis of educational production is notoriously difficult. First of all, education is characterized by multiple outcomes. Schools are charged with developing cognitive skills in a number of subject areas, as well as affective traits, promoting democratic values and furthering other social goals. Some outcomes are jointly produced, (e.g., cognitive skills and self-esteem), while others may be mutually exclusive (e.g., higher academic standards and higher graduation rates). Second, even if it were possible to separate outcomes, there is no obvious way to assign *a priori* weights to reflect the relative value of each. Consequently, there is no unambiguous way to sum the various production activities into a single outcome measure.

Researchers have responded to the problem of joint production of educational outcomes by focusing on one relatively easy to measure outcome and assuming the other outcomes are produced as by-products. This approach emphasizes student learning and the testing

of cognitive skills in key subjects such as reading and mathematics and simplifies the analysis of schools' production efficiency considerably. This approach also enjoys a wide political consensus across states and school districts and provides the basis of school accountability systems in virtually every state.

At the same time, there is growing recognition that any measure of school performance (i.e., production efficiency) must account for inputs that are beyond the control of those in the school, particularly student and community characteristics and school resource levels. The production function approach allows us to estimate the marginal educational contributions of identified educational inputs, both "controllable" and "uncontrollable," and to identify those controllable inputs with positive marginal products. These estimated products can then be compared with corresponding input costs to improve allocative efficiency. The production function approach can also be used to identify school districts and schools that consistently produce levels of student achievement that exceed (or fall short of) levels predicted by the identified inputs. These consistently higher or lower than predicted performance levels can be attributed to practices or characteristics of the schools and districts that are not identified in the production model. Levin contends that these unmeasured and often unobserved practices and characteristics can be very important to school performance.¹² Levin builds upon Leibenstein's seminal article on x-efficiency in which incentives and other generally unmeasured organizational attributes of the firm are viewed as making a greater contribution to firm efficiency than the marginal reallocation of inputs.¹³

The Production Function Model

Hanushek proposed a framework for an educational production function that distinguishes among family background, peer, and school inputs.¹⁴ A simplified version of this production function is of the following form:

$$A = f(B, P, S)$$

where *A* represents all outcomes, *B* represents all family background inputs, *P* represents all peer inputs, *S* represents all school inputs and *f*(.) is the function or production process that transforms the inputs into outcomes. Citing the absence of a well-developed theory of learning to guide the estimation of this model, Monk observed that researchers generally choose input measures on intuitive grounds because they are important for policymaking, or because the data are readily available.¹⁵ All three factors have influenced our selection of input variables and outcome measures. Following Hanushek's framework, we estimated the following model:

$$A = b_0 + b_1SES + b_2RLADMIN + b_3RLSUPPORT + b_4RLINSTRUCT + b_5RNLINSTRUCT + b_6Tch_yrs + b_7Tch_sal + b_8Tch_age + b_9PCT_mas + b_{10}Tot_adm + b_{11}TotalPP + \epsilon$$

where *A* is measured student achievement in reading and mathematics for grades three and five (READ3, READ5, MATH3, and MATH5);¹⁶

SES is an index of family and peer inputs;

RLADMIN is licensed administrators per 1,000 students;

RLSUPPORT is licensed support staff per 1,000 students;

RLINSTRUCT is licensed instructional staff per 1,000 students;

RNLINSTRUCT is non-licensed instructional staff per 1,000 students;

Tch_yrs is teachers' average years of teaching experience;

Tch_sal is average teacher salary;

Tch_age is average teacher age;

Pct_mas is percent of teachers with a masters degree;

Tot_adm is total average daily attendance; and

Total PP is total operating expenditures per pupil.

ε is an error term

A pooled time series of school-level data was obtained from the Minnesota Department of Children, Families and Learning for all elementary schools in Minnesota for four years, 1998 through 2001. All schools reporting data to the state were included in the study. Reporting of school-level data was optional in 1998, and 506 schools participated that year. Participation rose to 671 schools in 1999, 690 in 2000, and 694 in 2001, thereby including all elementary schools in the state. Data for all variables were reported by participating schools, with the exception of teachers' average years of teaching experience for 1998. For that variable, schools' 1999 data were also used in the 1998 data base. Achievement data consisted of building average scores on statewide assessments of reading and mathematics in grades three and five for each of the four years.¹⁷ The SES index is a weighted average of five component variables: (1) percent of children in the school who are eligible for free or reduced price lunch; (2) percent of children who are minority; (3) percent of children who are in special education; (4) reported disciplinary incidents as a percent of building enrollment; and (5) intra-district mobility rate.¹⁸

Results

Our model was estimated by weighted least squares (WLS), with each observation (school) weighted by the square root of the school's average daily membership.¹⁹ Separate stepwise regressions were run for each of the outcome measures (READ3, READ5, MATH3, and MATH5) for each of the four years. Descriptive statistics are presented in Table 1, and regression results are given in Table 2. The F-value tolerances for entry and removal of independent variables in the stepwise regression routine were set at .20 and .25, respectively.²⁰

The cross-section regressions reveal the importance of the SES index in explaining variation in student test scores. SES was statistically significant at the .01 level in each equation, with an *R*² ranging from .487 to .740. Thus, the index explained anywhere from about half to three-quarters of the variation in test scores. The SES effect was more pronounced in reading, but was also substantially greater with grade 5 math results than with grade 3 math. Clearly, such powerful SES effects would render school level scores meaningless as indicators of school quality.

The most influential school variables were teacher characteristics. Teacher salary was statistically significant at the .01 level in five equations and at the .05 level in two others. All coefficients were positive. The effect was greatest for grade 5 math performance, with significance in every year. Coefficients on teacher age were positive and statistically significant in four equations, all for reading (third and fifth grades for both 2000 and 2001). Finally, and somewhat surprisingly, the teacher experience coefficient was negative and statistically significant in four equations – 1998 READ5, 1999 MATH5, 2000 MATH3, and 2000 MATH5. Taken together, these findings suggest that higher salary schedules have succeeded in recruiting and retaining more skilled teachers, all else equal. Beyond that, the inconsistent findings regarding teacher age and experience are open to varying interpretations and remain ambiguous.

Table 1
Descriptive Statistics

Variable	1998		1999		2000		2001	
	Mean	Std. Dev.						
READ3	1401.34	74.64	1419.19	79.23	1451.76	83.78	1479.28	79.50
READ5	1407.73	84.51	1442.69	85.79	1483.16	93.76	1536.52	93.97
MATH3	1389.79	93.16	1451.66	97.09	1470.15	95.39	1489.12	91.80
MATH5	1384.64	84.67	1409.77	86.30	1461.05	91.08	1484.99	87.85
SES	365.05	258.43	367.60	270.79	346.6	231.14	344.42	232.39
RLADMIN	2.65	1.78	2.78	1.97	2.81	1.75	2.58	1.78
RLSUPPORT	3.47	2.38	3.35	2.43	3.73	2.13	3.24	2.33
RLINSTRUCT	63.49	13.36	65.26	13.73	67.43	14.62	68.05	13.46
RNLINSTRUCT	18.46	11.14	19.63	11.52	21.07	12.24	21.95	20.60
Tch_yrs	14.91	3.53	14.91	3.53	15.00	3.49	14.35	3.39
Tch_sal	41374.07	5223.84	40569.14	5326.03	40413.01	5322.70	42876.11	5430.58
Tch_age	42.29	3.45	42.22	3.55	41.74	3.30	41.77	3.38
PCT_mas	40.29	20.05	37.35	20.63	37.60	19.98	37.74	20.63
Tot_adm	493	210.86	461.97	213.64	458.66	211.42	452.84	212.40
Total PP	4859.78	3922.34	4818.02	3812.75	5188.81	2522.82	5213.26	2527.40
N	506		671		690		694	

Licensed instructional staff per 1,000 students was also found to positively influence student performance. The coefficient on RLINSTRUCT was positive and statistically significant in six equations. Interestingly, five of the six involved math achievement. No other resource measures were found to be statistically significant in more than two of the sixteen equations. In summary, teaching staff seemed important to student achievement, with investment in well-paid teachers and higher teacher-pupil ratios yielding a positive marginal product.

These regression models, as one might expect, are subject to considerable collinearity among the independent variables. This multicollinearity increases the variance of our coefficient estimates (while our large sample sizes decrease this variance), and the stepwise regression procedure may overestimate the influence of SES on student achievement; that is, the estimated marginal effect of an independent variable on student achievement will depend, in part, on the order in which it is entered into the estimated model. Consequently, the models were re-estimated with the order of entry of the independent variables controlled by the researchers.²¹

Specifically, in view of the substantial evidence confirming the importance of family and peer effects on student achievement and the mixed findings regarding school effects, each outcome variable was regressed against the SES index only and then regressed over the measures of school resources. Finally, each outcome variable was regressed over both the SES and school resource variables. The differences in the coefficient of determination, or R^2 , were interpreted as upper and lower bounds for the estimated influence of each set

of independent variables on student achievement given the multicollinearity among the variables. These changes in the coefficients of determination are presented in Table 3.

The R^2 change associated with the SES index was subtracted from the model's total R^2 to derive a lower bound for the effect of the school resource measures on student achievement. The SES index was found to explain between 45 and 71 percent of the variance in student achievement. When the SES index entered the regression first and the school resource measures second (collectively designated SCHOOL 2 in the table), the SES index is attributed with virtually all the power to explain variance in student achievement and negligible influence is attributed to school resources. In contrast, when the school resource measures are entered first (SCHOOL 1), their assigned explanatory power is about one half the explanatory power of SES, indicating considerable collinearity among the SES and school resource measures. This collinearity makes it difficult to disentangle and estimate their separate influences on student achievement. Moreover, any unobserved school and district effects, as opposed to the observed effects of the school resource variables, are concealed in the error terms of the regressions. The magnitude of the unexplained variance is (1-TOTAL), labeled E/U for "error/unexplained" variance.

Analysis and Discussion of Residuals

The residuals in these regressions consist of school and district fixed effects, both unobserved, along with random error. In order to estimate the magnitude of these unobserved but nonrandom effects, the residuals were examined for each observation (school) to

Table 2
Weighted Least Squares (WLS) Regression Results, 1998-2001

1998	Dep = MATH5					
Step	Predictor Entered	Beta	R-sq Change	Cumulative R-sq	Adj. R-sq	SEE
1	SES	-0.845**	0.621	0.621	0.621	257.4244
2	TCH_SAL	0.089**	0.004	0.625	0.624	256.3583
3	RLINSTRUCT	0.108**	0.005	0.63	0.629	254.7226
4	RLADMIN	-0.037	0.001	0.631	0.629	254.585
	Dep = MATH3					
1	SES	-0.737**	0.516	0.516	0.515	300.831
2	RNLINST	0.083*	0.002	0.518	0.516	300.361
3	TCH_SAL	0.093	0.004	0.521	0.519	299.482
4	RLADMIN	-0.049	0.002	0.523	0.52	299.203
5	PCT_MAS	-0.053	0.002	0.524	0.521	298.908
	Dep = READ5					
1	SES	-0.88**	0.715	0.715	0.714	212.774
2	TCH_SAL	0.123*	0.009	0.724	0.723	209.555
3	TCH_YRS	-0.086*	0.004	0.728	0.726	208.293
4	TOT_ADM	-0.055*	0.002	0.73	0.728	207.788
5	TOTAL PP	-0.043	0.002	0.732	0.729	207.252
6	PCT_MAS	0.041	0.001	0.733	0.73	207.06
7	RNLINST	0.033	0.001	0.734	0.73	206.925
	Dep = READ3					
1	SES	-0.909**	0.74	0.74	0.739	179.518
2	TCH_SAL	0.103**	0.002	0.742	0.741	178.865
3	RLINSTRUCT	0.06	0.003	0.745	0.743	178.143
4	TOTAL PP	-0.042*	0.001	0.746	0.744	177.877
5	TCH_YRS	-0.052	0.001	0.747	0.745	177.66
6	TOT_ADM	-0.04	0.001	0.748	0.745	177.387
1999	Dep = MATH5					
1	SES	-0.812**	0.626	0.626	0.626	424.792
2	TCH_SAL	0.126**	0.008	0.634	0.633	240.519
3	TCH_YRS	-0.081*	0.004	0.638	0.636	239.428
4	RLSUPPORT	-0.042	0.001	0.639	0.637	239.172
	Dep = MATH3					
1	SES	-0.779**	0.537	0.537	0.536	299.629
2	TCH_SAL	0.077	0.002	0.54	0.538	299.064
3	RLINSTRUCT	0.072*	0.003	0.543	0.541	298.269

Table 2 Continued
Weighted Least Squares (WLS) Regression Results, 1998-2001

1999	Dep = READ5					
Step	Predictor Entered	Beta	R-sq Change	Cumulative R-sq	Adj. R-sq	SEE
1	SES	-0.788**	0.687	0.687	0.687	221.732
2	PCT_MAS	0.068**	0.006	0.693	0.692	219.848
3	TOTAL PP	-0.057	0.003	0.695	0.694	219.102
4	RNLINST	-0.039	0.001	0.697	0.695	218.779
	Dep = READ3					
1	SES	-0.835**	0.623	0.623	0.623	222.226
2	TCH_SAL	0.135**	0.006	0.629	0.628	220.559
3	RLINSTRUCT	0.057	0.002	0.632	0.63	220.069
4	TOTAL PP	-0.048	0.002	0.633	0.631	219.742
5	TOTAL ADM	-0.046	0.001	0.634	0.631	219.633
6	TCH_YRS	-0.044	0.001	0.636	0.632	219.376
2000	Dep = MATH5					
1	SES	-0.903**	0.703	0.703	0.702	217.937
2	PCT_MAS	0.089	0.008	0.711	0.709	215.316
3	TCH_YRS	-0.11**	0.003	0.713	0.711	214.554
4	TCH_SAL	0.143**	0.005	0.718	0.716	212.831
5	(PCT_MAS deleted)	---	-0.001	0.718	0.716	212.841
6	RNLINST	0.057*	0.003	0.72	0.718	212.054
	Dep = MATH3					
1	SES	-0.854**	0.641	0.641	0.641	262.585
2	TCH_YRS	-0.073*	0.002	0.643	0.642	262.172
3	TCH_SAL	0.097	0.004	0.647	0.645	261.017
4	RLIINSTRUCT	0.082*	0.003	0.65	0.647	260.087
5	TOTAL PP	-0.06	0.003	0.653	0.65	259.212
	Dep = READ5					
1	SES	-.829**	0.668	0.668	0.667	248.37
2	TCH_AGE	0.053*	0.003	0.67	0.669	247.57
3	RLSUPPORT	0.033	0.001	0.671	0.67	247.418
	Dep = READ3					
1	SES	-0.858**	0.677	0.677	0.677	218.507
2	TCH_AGE	0.102*	0.005	0.682	0.681	217.126
3	TCH_YRS	-0.079	0.002	0.684	0.683	216.556
4	TCH_SAL	0.069	0.001	0.685	0.683	216.37
5	PCT_MAS	-0.045	0.001	0.686	0.684	216.165

Table 2 Continued
Weighted Least Squares (WLS) Regression Results, 1998-2001

2001	Dep = MATH5					
Step	Predictor Entered	Beta	R-sq Change	Cumulative R-sq	Adj. R-sq	SEE
1	SES	-0.847**	0.604	0.604	0.603	254.654
2	TCH_SAL	0.123*	0.004	0.608	0.607	253.507
3	RLINSTRUCT	0.119**	0.004	0.612	0.61	252.272
4	RLSUPPORT	-0.063*	0.002	0.614	0.611	251.926
5	TCH_YRS	-0.054	0.002	0.615	0.613	251.562
6	TOT_ADM	-0.041	0.001	0.616	0.613	251.381
7	RNLINST	-0.035	0.001	0.617	0.614	251.236
	Dep = MATH3					
1	SES	-0.722**	0.487	0.487	0.486	296.404
2	TCH_YRS	0.049	0.005	0.492	0.491	295.053
3	RLINSTRUCT	0.105*	0.003	0.495	0.493	294.452
4	RLSUPPORT	-0.079*	0.003	0.498	0.495	293.703
5	TCH_SAL	0.048	0.002	0.5	0.496	293.428
	Dep = READ5					
1	SES	-0.883**	0.681	0.681	0.68	244.95
2	TCH_AGE	0.137**	0.007	0.688	0.687	242.34
3	RLINSTRUCT	0.068*	0.003	0.691	0.689	241.47
4	TCH_YRS	-0.074	0.001	0.692	0.69	241.07
5	TOT_ADM	-0.041	0.001	0.693	0.691	240.8
6	RNLINST	-0.034	0.001	0.694	0.692	240.58
	Dep = READ3					
1	SES	-0.791**	0.616	0.616	0.615	225.163
2	TCH_AGE	0.098**	0.011	0.627	0.625	222.107
3	TOT_ADM	-0.038	0.001	0.628	0.626	221.874

** denotes $p < .01$

* denotes $.01 < p < .05$

identify schools and districts that consistently over- or under-performed as compared with outcome levels predicted by the SES and school resource measures. For example, a school that consistently exceeded its test performance as predicted by its students' characteristics (SES) and resource levels is assumed to benefit from positive but unobserved school and district attributes, attributes sometimes referred to as X-efficiency. For each outcome (i.e., grade level and subject), the residual was averaged by school building over the four years. Data for all four years were available for 476 schools. If the residuals were random, they would necessarily have a mean of zero.²² They are not random, however, if they include the effects of unobserved variables that influence student achievement. Specifically, the average building residual reflected the joint effect on achievement made by the school and district. To decompose this

effect into school and district effects, the residuals were averaged by school district, and the district average was subtracted from the total residual. The district average was interpreted as the upper bound for the district effect, and the difference between the total building residual and the district average was interpreted as the upper bound for the school effect.

To estimate the magnitude of these unobserved building and district effects on student achievement, the achievement measures were then regressed over these average residuals and the SES and school resource measures. The R^2 changes resulting from these step-wise regressions are presented in Table 4. As the results reported in Table 4 indicate, the district accounted for between 6 and 12 percent of the variance in measured achievement across all estimated models, averaging about 11 percent for mathematics and 8

Table 3
Upper and Lower Bounds for Estimates of R² Changes

Summary for MATH3					
	Year				
	98	99	00	01	Aug.
SES	0.6122	0.5034	0.4830	0.4492	0.5120
SCHOOL 1	0.3120	0.2226	0.2517	0.2545	0.2602
SCHOOL 2	0.0129	0.0081	0.0107	0.0200	0.0129
SES+SCH2	0.6251	0.5115	0.4937	0.4692	0.5249
E/U	0.3749	0.4885	0.5063	0.5308	0.4751
N	506	671	691	695	

Summary for MATH5					
	Year				
	98	99	00	01	Aug.
SES	0.6867	0.6033	0.5863	0.5704	0.6117
SCHOOL 1	0.3605	0.2905	0.3007	0.2656	0.3043
SCHOOL 2	0.0202	0.0107	0.0107	0.0074	0.0123
SES+SCH2	0.7069	0.6140	0.5970	0.5778	0.6239
E/U	0.2931	0.3860	0.4030	0.4222	0.3761
N	506	671	691	695	

Summary for READING3					
	Year				
	98	99	00	01	Aug.
SES	0.7105	0.5849	0.6460	0.5753	0.6292
SCHOOL 1	0.3543	0.2642	0.3528	0.3257	0.3243
SCHOOL 2	0.0074	0.0141	0.0129	0.0195	0.0135
SES+SCH2	0.7179	0.5990	0.6589	0.5948	0.6427
E/U	0.2821	0.4010	0.3411	0.4052	0.3574
N	506	671	691	695	

Summary for READING5					
	Year				
	98	99	00	01	Aug.
SES	0.7002	0.6655	0.6396	0.6483	0.6634
SCHOOL 1	0.3711	0.3535	0.3543	0.3308	0.3524
SCHOOL 2	0.0180	0.0120	0.0088	0.0129	0.0129
SES+SCH2	0.7182	0.6775	0.6484	0.6612	0.6763
E/U	0.2818	0.3225	0.3516	0.3388	0.3237
N	506	671	691	695	

percent for reading. The building accounted for between 11 and 18 percent of the variance in measured achievement, averaging about 16 percent for mathematics and 14 percent for reading. When the district is omitted from the regression, and the entire effect is attributed to the building, the building effect rises to an average of 22 percent for reading and 27 percent for mathematics. These effects, which reflect unobserved qualities of school administrators, faculty, support staff, and the climate they create, along with other unobserved variables, are substantial. The R² changes associated with building and district effects were then added to the R² changes associated with SES and school resource effects to obtain an estimate of the total explained variance in student achievement (R²_{total}). The unexplained variance is estimated as (1-R²_{total}) and is attributable to random error.

One may expect that these unobserved school and district effects would be roughly consistent across grades and subjects; that is, a good elementary school is good in all grades and subjects. To further examine the consistency of these effects across subjects and grades, the simple correlations across subjects and grades were examined. These correlation coefficients are presented in Table 5. The correlations are relatively high, confirming that the fixed effects or levels of x-efficiency taking place within a school building and school district tended to be consistent across subjects and grades over the four-year period examined. This conforms to intuition. The effects of such unobserved school and district variables as climate, communications, shared vision and goals, leadership, and incentives should be reflected throughout the school and not restricted to particular grades

and subjects.

More generally, this consistent pattern of fixed effects or x-efficiency among the district and building residuals provides a measure of school and district influence on the quality of teaching and learning in the classroom. Not surprisingly, effective schools are found in effective districts. This finding was consistent across subjects and grade levels. Such a pattern of residuals reflects the effects of activities, climate, policies, incentives, instructional practices, and other inputs that are consistently present in the schools and districts but are not captured by the SES or school resource variables.²³

Summary and Policy Conclusions

In keeping with a vast research literature on educational productivity, this analysis revealed that the socioeconomic characteristics of students remain the most influential factor in predicting achievement outcomes. A high SES school building (three standard deviations above the mean) can be expected to add about 30 percentile points to the average achievement level, raising a student from the 50th percentile to about the 80th, while a correspondingly low SES building would fall 30 percentile points below the mean. This relationship is depicted in standardized units in Figure 1.

SES exerted a much larger influence on academic achievement than did the various measures of school resources. Further, our estimates of school district and building fixed effects were considerably larger than the estimated effects of the school resource variables. This finding is consistent with Leibenstein, who observed in his seminal article on

Table 4
Analysis of Residuals: Building and District Fixed Effects

Summary for MATH3						Summary for MATH5						
	Year						Year					
	98	99	00	01	Aug.		98	99	00	01	Aug.	
Four Year Avg. N (E/U for the same N)						476						476
TOTAL	0.8389	0.8049	0.7922	0.7861	0.8055	.09353	0.8830	0.8955	0.8584	0.8931		
BUILDING	0.1431	0.1696	0.1336	0.1978	0.1610	0.1281	0.1544	0.1805	0.1704	0.1584		
DISTRICT	0.0707	0.1238	0.1649	0.1191	0.1196	0.1003	0.1146	0.1180	0.1102	0.1108		
B AND D	0.2138	0.2934	0.2985	0.3169	0.2807	0.2284	0.2690	0.2985	0.2806	0.2691		
SES+SCH2	0.6251	0.5115	0.4937	0.4692	0.5249	0.7069	0.6140	0.5970	0.5778	0.6239		
ERROR	0.1611	0.1951	0.2078	0.2139	0.1945	0.0647	0.1170	0.1045	0.1416	0.1070		

Summary for READING3						Summary for READINGS5						
	Year						Year					
	98	99	00	01	Aug.		98	99	00	01	Aug.	
Four Year Avg. N (E/U for the same N)						476						476
TOTAL	0.9503	0.8212	0.9152	0.8163	0.8758	0.9383	0.9100	0.8723	0.8832	0.9009		
BUILDING	0.1111	0.1474	0.1274	0.1632	0.1373	0.1253	0.1338	0.1503	0.1487	0.1395		
DISTRICT	0.0640	0.0850	0.0948	0.0931	0.0842	0.0860	0.0863	0.0822	0.0752	0.0824		
B AND D	0.1751	0.2324	0.2222	0.2563	0.2215	0.2113	0.2201	0.2325	0.2239	0.2220		
SES+SCH2	0.7179	0.5990	0.6589	0.5948	0.6427	0.7182	0.6775	0.6484	0.6612	0.6763		
ERROR	0.0497	0.1788	0.0848	0.1837	0.1243	0.0617	0.0900	0.1277	0.1169	0.0991		

Figure 1
Influence of SES on Student Achievement

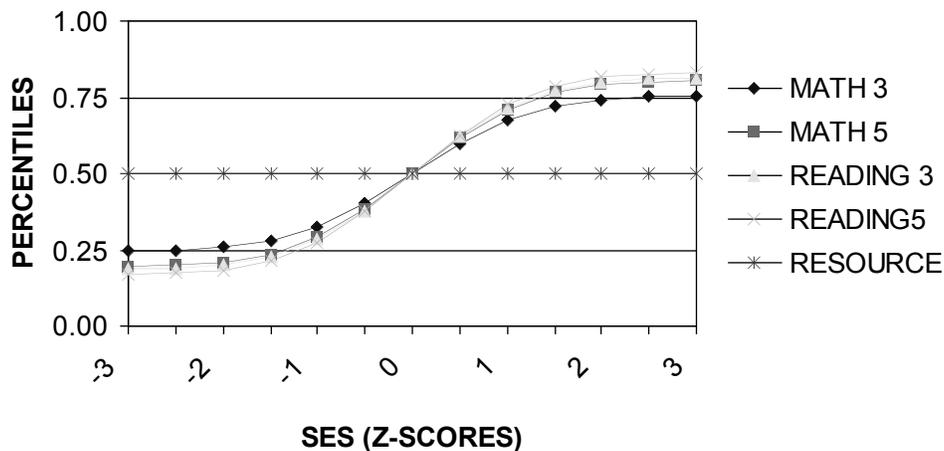


Table 5
Consistency of Building and District Effects:
Correlations Among Estimates Across Grades and Subjects

Correlations			
	MATH 3	MATH 5	READ 5
			READ 3
B-D		0.57	0.61
DAVE		0.75	0.52
BAVE		0.67	0.56
		READ 5	READ 5
	MATH 3		MATH 5
B-D		0.61	0.88
DAVE		0.52	0.89
BAVE		0.56	0.87

X-efficiency in organizations that incentives, motivation, culture, and other organizational characteristics have far greater implications for efficiency than the allocation of inputs at the margins.

By our estimates, unobserved district characteristics exerted an influence on achievement outcomes, adding about five points at the high end (i.e., three standard deviations above the mean) and subtracting about five points at the low (i.e., three standard deviations below the mean). These effects are depicted in standardized units in Figure 2.

Unobserved building characteristics also exerted an influence on achievement outcomes, adding about seven points at the high end and subtracting about seven points at the low. These estimated effects are depicted in standardized units in Figure 3.

These findings hold several important implications for school accountability policies. First, holding schools accountable for average levels of measured achievement outcomes is tantamount to holding them accountable for the SES of the community. Level scores of

student achievement say little about school quality. To ascribe high quality to schools in which children attain high scores on achievement tests is to confuse school quality with student attributes. Second, when SES and school resource variables are taken into consideration, high-performing and low-performing schools are found in all SES strata. Holding schools accountable for achievement outcomes when SES and school resources are taken into consideration may be appropriate. This could be accomplished by means of “value-added” analysis of the results of annual testing of every student in a school.

Further, a production function model of student achievement could be used to identify school districts and buildings that consistently exceed predicted performance levels. These school and districts should be the subject of case studies to identify the sources of their x-efficiency. Insights gained into school and, particularly, district climate, policies, operations, and incentives could be invaluable as states look for ways to improve teaching and learning in their public

Figure 2
Estimated District Fixed Effects

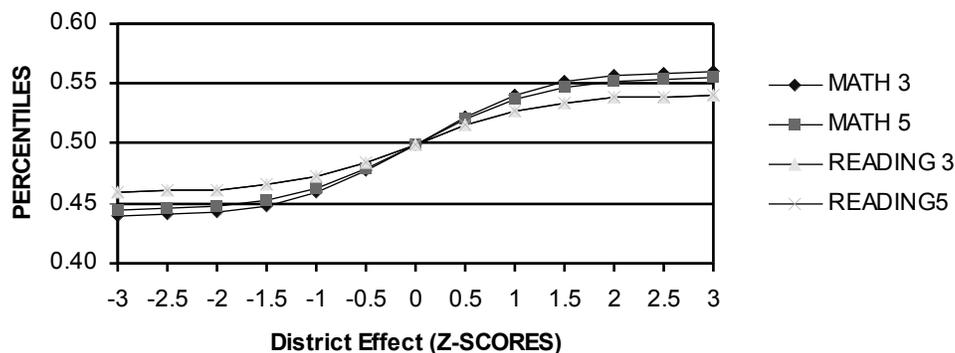
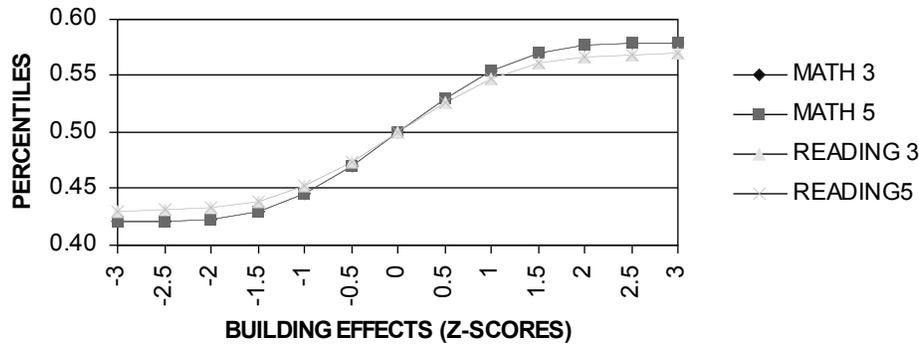


Figure 3
Estimated Building Fixed Effects



schools in an economic environment that promises little in the way of increased resources in the near future. Case studies of this sort are not unusual in education research but are generally not conducted as part of an ongoing and systematic state-level effort to improve teaching and learning in our public schools. Currently, state departments of education and regional educational service agencies generally do not gather information regarding the behavior, activities, policies, or leadership at the school district or building levels that could explain differences in achievement outcomes across schools. Such qualitative data could be of enormous value to the schools. As the saying goes, "Not everything that counts can be counted," but leadership and sound practice can be observed and replicated.

Endnotes

¹ An earlier version of this paper was presented at the 2004 Annual Conference of the American Education Finance Association in Salt Lake City, Utah. Dr. Addonizio's work was supported by a grant from the State Policy Center of Wayne State University. Their support is gratefully acknowledged.

² *Goals 2000: Educate America Act*, P.L. 103-227, Section 301(1).

³ Margaret E. Goertz and Mark C. Duffy, *Assessment and Accountability in the 50 States: 1999-2000*, CPRE Research Report Series RR-046 (Philadelphia, PA: Consortium for Policy Research in Education, 2001).

⁴ For a discussion of this outcomes-based approach to school accountability, including the measurement of student and school performance and the design of associated school ratings, rewards, and sanctions, see Richard Elmore, C. Abelman, and Susan Fuhrman "The New Accountability in State Education Reform: From Process to Performance," in *Holding Schools Accountable: Performance-based Reform in Education*, Helen F. Ladd, ed. (Washington, DC: Brookings Institution, 1996), 65-98. See also Richard King and J. Mathers, "Improving Schools Through Performance-based Accountability and Financial Rewards," *Journal of Education Finance* 23 (Fall 1997): 147-176.

⁵ See, for example, Eric Hanushek, *Making Schools Work: Improving Performance and Controlling Costs* (Washington, DC: The Brookings Institution, 1994); see also, Henry M. Levin, "Raising School Productivity: An X-efficiency Approach," *Economics of Education Review* 16 (June 1997): 303-311.

⁶ Kane and Staiger also found that changes in fourth-grade math gains have a correlation of 0.45 with changes in the next year, suggesting that 90% of the variance in the change in change scores is transitory. The authors report even less persistence in reading scores. The authors conclude that "...if one were to look for signs of improvement by closely tracking changes in school-level scores from one year to the next, most of what one observed would be temporary - either due to sampling variation or some other nonpersistent cause." Thomas J. Kane and Douglas O. Staiger, "The Promise and Pitfalls of Using Imprecise School Accountability Measures," *Journal of Economic Perspectives* 23 (Fall 2002): 97.

⁷ They also found a correlation of -.05 for a weighted index of all performance levels in a school. Robert L. Linn and C. Huag, "Stability of School-Building Accountability Scores and Gains," *Education Evaluation and Policy Analysis* 24 (Spring 2002): 29-36.

⁸ *Ibid.*, 33.

⁹ Kane and Staiger, "The Promise and Pitfalls of Using Imprecise School Accountability Measures."

¹⁰ Helen F. Ladd and R. Walsh, "Implementing Value-Added Measures of School Effectiveness: Getting the Incentives Right," *Economics of Education Review* 21 (February 2002): 1-17; Charles Clotfelter and Helen F. Ladd, "Recognizing and Rewarding Success in Public Schools," in *Ladd*, 23-63.

¹¹ Considerable controversy exists as to whether educational phenomena can be adequately represented in a strict production function framework. For an overview of the debate about the existence of an educational production function, see David Monk, *Educational Finance: An Economic Approach* (New York: McGraw-Hill, 1990), especially chapter II. This brief summary draws upon Monk's overview.

¹² Levin, "Raising School Productivity."

¹³ Harvey Leibenstein, "Allocative Efficiency and X-Efficiency," *The American Economic Review* 56 (March 1966): 392-425.

¹⁴ Eric A. Hanushek, "Conceptual and Empirical Issues in the Estimation of Educational Production Functions," *Journal of Human Resources* 14 (Summer 1979): 351-88.

¹⁵ Monk, *Educational Finance*.

¹⁶ In using reading and mathematics test scores as performance indicators, we assume these tests are valid for this use; that is, we

assume that these tests measure skills demanded by society (outcome validity) and that they accurately measure performance with respect to these skills (noncorruptability). For a discussion of school performance indicators, see Robert H. Meyer, "Value-Added Indicators of School Performance: A Primer," *Economics of Education Review*, 16 (June 1997): 283-301.

¹⁷ Individual student scores on Minnesota's reading and mathematics assessments are based on a scale ranging from a minimum of approximately 50 to a maximum of approximately 2,500. The minimum and maximum scale scores vary slightly from year to year according to the performance of students at the extremes of the achievement range.

¹⁸ Each of these component variables was found to be statistically significant in regressions of student achievement for each of the four years. Each component variable was then assigned a weight inversely proportional to its variance averaged over the four years. With this weighting method, each component variable contributes approximately the same amount of variance to the total variance of the composite SES variable. The SES index is an inverse measure of socioeconomic status; that is, a higher index score reflects lower socioeconomic status. For a complete discussion of the construction of composite measures, see J. P. Guilford, *Fundamental Statistics in Psychology and Education* (New York: McGraw-Hill, 1965), 416-426.

¹⁹ Weighted least squares is an appropriate estimation technique when one suspects that the error terms are not of equal variance for each observation (heteroskedasticity). The most common instance of

heteroskedasticity is with aggregate data, such as the school-level data examined here, where the dependent variable is a mean value for the individuals in the observational unit. The accuracy of the dependent variable will be a function of the number of individuals in the aggregate; that is, observations for the more populous units (e.g., schools) are presumably more accurate and should exhibit less variation about the true value than data drawn from smaller schools. This leads to different values of the error term variance for each observation--the heteroskedastic problem. For discussion see, for example, Eric Hanushek and John Jackson, *Statistical Methods for Social Scientists* (San Diego, CA: Academic Press, 1977) 142-153.

²⁰ For a discussion of the stepwise regression routine, see, for example, John Neter and William Wasserman, *Applied Linear Statistical Models* (Homewood, IL: Richard D. Irwin, Inc., 1974), 383.

²¹ The following regressions are unweighted. These unweighted regressions yielded slightly lower coefficients of determination in 14 of 16 equations as compared with the weighted regressions. The average difference was approximately .028.

²² The assumption that the error term has a mean value of zero is, of course, a part of the classical linear regression model. See, for example, Domar Gujarati, *Essentials of Econometrics* (New York: McGraw-Hill, Inc., 1992), 186-187.

²³ For a discussion of the importance of such generally unobserved school and district characteristics, see Levin, "Raising School Productivity."

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